

ARCHIVES OF PHYSICAL THERAPY, X-RAY RADIUM

VOL. VIII

JULY, 1927

No. 7

ULTRA VIOLET LIGHT IN THE TREATMENT OF ABSCESSSED TEETH AND IN PYORRHEA ALVEOLARIS*

ISAAC L. FOLSTEIN, D. D. S.

NEW YORK, NEW YORK

It is to the credit of the medical practitioners that they should have been the first to recognize and to apply the principles and laws for the use of the ultra violet rays. From the literature that I have been perusing and from all the practical work I have seen done by the medical fraternity, I must compliment you on the usages to which you have put your knowledge that you have of the rays, and mankind ought indeed to thank you for what you have done.

We in dentistry have been a little bit slow in regard to physical therapy. Very few men have been found who would devote their time to the research necessary before the profession could as a whole have sufficient data with which to work. Naturally this has taken a few years. But here we are almost abreast of the times and ready to work together with you of the medical world and to see if working with you and with the ultra violet rays, we cannot do more good to humankind than we have been doing up to now.

I feel that I shall indeed have done a great deal of good if after I leave you I shall have left you with but one thought. This thought has

ever been uppermost in all my work, in fact it has been responsible for all the heartache and headache that you all know goes with research in general. I have had not only the skepticism of the layman to contend with, but also that of the average dentist and especially that of the average physician to fight down. I want to impress upon you, that you carry away from here this—that it is worth everything to try and *conserve the human teeth*. No restoration, no appliance, no matter how well made nor how beautiful, can in any shape, manner or form compare with the teeth that we were created with. Those of you here now within the hearing of my voice know exactly the truth of this remark. I have patients coming into my office every day requesting me to extract this tooth or that, because they hurt. Patients come to me telling me that their doctor had looked into their mouths and told them to extract all their teeth and then have a pair of plates made. I oftentimes wonder if these same physicians would do the same thing to their own teeth or to those of their immediate family. I do not often recall having a patient come to me suffering with pyorrhea alveolaris or Rigg's disease, without this remark, "Doctor, I have pyorrhea, I think you had bet-

*Read at fifth annual meeting, American College of Physical Therapy, Chicago, October 20, 1926.

ter extract my teeth." It is only after examination, when I tell them that we would not have to have recourse to such extreme measures and that the teeth can be saved, that they want to know how and if it really is true.

The medical profession has written volumes upon foci of infection. Within the last ten years, you folks have seen fit to lay everything that has struck you to have risen from a hidden source, as coming from some foci around the teeth. In a number of cases, after you had in-

deavors to bring the teeth together, relieved only upon cold and oftentimes the gum will be slightly swollen. An x ray will usually show the presence of a granuloma or pus sack and the average dentist will invariably consign this tooth to the forcep. Or, the patient may present with a good deal of facial edema sometimes extending even to the closing up of the eye on the side involved. Of course the average dentist immediately extracts. The method involving the forcep is really the easiest and the quickest, but as to its being the best, I will let you be the



Figs. A and C—Roentgenogram of tooth at beginning of treatment.

structed your patient to visit the dentist and have the necessary teeth extracted, the various symptoms, previously manifested, disappeared, and you felt fine. You were convinced that that really had been the cause and that now your patient would not have to suffer any further. You have carried this theory so far, gentlemen, that now, we of the dental world have everything to do to convince our patients that we can do the very thing the physician wants us to do without the promiscuous taking out of teeth. Abscessed teeth, as well as pyorrhitic teeth, can today be saved, the foci of infection can be entirely eradicated and the tooth still be retained. All this, gentlemen, can be successfully done with the aid of the ultra violet rays, and this is the thought that I want to convey to you. How this can be done I shall now endeavor to show you. We shall begin with the abscessed tooth.

A patient presents with a tooth sensitive to percussion, he feels pain every time that he en-



Figs. B and D—At close of treatment, showing regeneration of bone in area previously occupied by root end pathology. These represent work done for two separate patients.

judge, especially if, as it very often happens to be, in the case of an anterior central in the mouth of a beautiful young woman of nineteen or twenty.

Upon determining the definite diagnosis and the taking of x rays this tooth is opened and the canal thoroughly cleansed and the abscess drained. The ultra violet rays are used in conjunction with the chemical and mechanical means employed. These rays are administered every second day both facially and lingually and after treatment for about three weeks we can generally fill the root canals and an x ray then taken, will reveal a cure, with the foci of infection removed and the regeneration of bone and periodontal structures.

The same course of treatment takes place when a cases presents with a fistulous tract opening upon the mucous membrane. The tooth is first opened and allowed to drain, as much as

possible of the canal contents of the root is removed and before dismissing the patient the rays are applied both facially and lingually. On alternate days, the rays are focused upon the same area, that is, at about the apical third of the tooth or at about the point where the apex of the tooth is judged to be. At each visit the canal contents are tested for any odor and when none is manifested, the canal is filled with chlororesin, chloropercha and gutta-percha points tightly packed. Upon the next visit an x ray picture is taken and this will reveal the abscess gone and the regeneration of new tissue in the area where previously necrosis had been. The fistula will by itself have disappeared or if it persists an applicator held over the opening with the light on for a few visits of about two or three minutes duration, will entirely close the tract up, never to appear again.

I have often been asked by our more skeptical friends and colleagues, if it was not possible to obtain the same results, in the case of abscessed teeth, without the use of the ultra violet rays, and my answer has always been the same. It is not possible. I have tried the same treatment any number of times without using the rays and invariably have met with failure, until I have been compelled to come to the conclusion that the rays were the factor most essential to our success. Where without the rays, I may obtain one or two successful cases out of a dozen, I will get ten or even eleven successful results out of twelve with the rays. As to the reason why, I can only give these theories.

The action of the ultra violet rays are as follows:—

1. The red blood cells, after receiving an increase in their energy content from the light radiation, carry to the cellular elements of the body an increased amount of oxygen, and carry away from these cellular elements an increased amount of toxins.
2. The stimulation of the power of phagocytosis of the white blood cells.

3. The stimulation of the calcium and phosphorus metabolism, or what amounts to the stimulation of the growth of new bone formation.

4. The destructive effect upon bacteria, the fact that bacteria cannot live and thrive when exposed to the ultra violet rays. It has not yet been possible to definitely show these chemical reactions conclusively. We cannot show these aforementioned reactions under a microscope but from actual observations and from clinical data it has been possible to arrive at these conclusions and I feel safe in putting them before you.

As perhaps all of you may know, the teeth are subject to that dreadful ravage, known as pyorrhea alveolaris, or sometimes referred to as Rigg's disease. It seems that with the coming of a finer civilization came this scourge. What seems to be its definite cause is as yet a mystery and what ever remedies have been tried have so far been of little avail.

The various methods of treatment now employed by the dental fraternity are these:—

1. The constitutional method—by the correcting of the diet.
2. The prophylactic method—by the scaling away of all the salivary and serumal deposits and the polishing of all the exposed parts of tooth structure and those parts that can be reached subgingivally.
3. The surgical method—by cutting away the soft tissues around the necks of the teeth involved, until the tips of the remaining bone tissue has been reached and in this way removing all the pockets where any debris can accumulate, thus avoiding the extention of these pockets more deeply.
4. The grinding for proper occlusion method—by grinding down on the occlusal surfaces of the teeth until, what the dentist calls a normal occlusion, has been obtained and in this way the teeth now striking properly with every movement of the jaws, the disease will be eradicated.

There is of course great room for debate as to whether any one of these methods, or any combination of them, is proving, or has so far proven, efficient. Every one of the advocates of these several methods claims for his method nothing but the best results. All of which may be true, but only in the hands of that particular advocate. Some of us are more thorough than others, and we are able to obtain fine results, but when these very same methods have been put into the hands of the average practitioner, they have invariably failed.

The surgical method indeed in the hands of the average man is really a hazardous task. More damage can be done than can be repaired by the best of us. The constitutional method perhaps, may take years and then it is merely presumption. The prophylactic method is nothing more or less than a good cleansing of the teeth and has never yet, as far as I have ever seen, netted any results, and the grinding for a balanced occlusion is to my mind nothing more than putting the cart before the horse. It is the claim of the advocates of this method that when the teeth go out of their proper alignment from the dental arch, the uneven pressure exerted by one tooth upon another, causes the loosening of the teeth, the formation of pus pockets and the absorption of the periodental and alveolar processes. Grinding the teeth down occlusally to their normal, restores them to their proper position and the disease is automatically eliminated. In answer to all this, there is but one question. What is a proper or normal occlusion? Dr. Martin Dewey has very recently come out with this very same question. Dr. Dewey is one of our most eminent orthodontists and is in a position to know. Naturally there can be no defining of a normal occlusion, for what is normal in one individual may be abnormal in another. How deeply must the cusps of an upper tooth fit into the sulci of a lower one? etc., etc.

Clinical experience will, I am sure, prove that pyorrhea alveolaris is primarily a disease

induced by certain definite bacteria. What that bacteria may be, has as yet not been determined. The above mentioned methods do not seem to be able to combat the particular germ involved, because none of them go to the seat of the trouble. None of them can destroy the bacteria.

Ultra violet radiation is to my mind, the most effective method that can be used to combat this disease. The theories before mentioned go to bear out this supposition and clinical results have indeed been very gratifying. We have been able to obtain results truly remarkable and I believe that this will eventually prove the method most adaptable. Without employing any other means than scaling and the ultra violet rays, we have been able to eradicate the flow of pus, restore red spongy gums to their normal pink tone, to remove any and all pus pockets, to tighten loose teeth, to prevent the easy bleeding of the gums upon the least irritation, to grow new periodental membrane and new alveolar process, in short, to bring about as near as it has ever been brought about before, a restoration to the normal.

The method itself is very simple. The teeth are first scaled thoroughly, both for serumal and salivary calculus and this followed up by the light radiation to every tooth individually both facially and lingually, only three or four teeth being treated at one time. Depending upon the severity of the case, results can be obtained in from one to three months, seeing the patient about three times weekly at the beginning of treatment and curtailing the visits when the treatments have passed the stage of six minutes devoted to each exposure, to two visits per week.

The method of applying the rays consists of holding a quartz rod applicator against the mucous membranes or soft tissues about the teeth in the region of the apical third of the tooth, using a slight pressure against the gum. The

reason for this is that we are desirous of dehematizing the area. Blood being an absorber of the light it would naturally carry it away with the circulation, but being desirous that the light should penetrate we dehematize in this manner. I have perfected a set of very thin applicators that I am using especially in pus pockets. These applicators fit directly down into the pus pockets, to their very depths, and in this way I am able to eradicate these pockets much faster than I would ordinarily be able to do.

The advantages in the use of the ultra violet, as a means of treating pyorrhea alveolaris, are indeed many. The mere fact that we can assure the patient a great deal of relief with a measure of certainty, is to my mind sufficient reason, and especially when in the course of our treatment practically no pain is given, this should add a still greater impetus to the adoption of this method, there is no bleeding to be encountered in this work, it does not result in any scarring, in the cases of the neurotics, there is no fear of shock, there is no unnecessary grinding away of any part of the tooth structure, the patient is not bothered with any follow up treatment, to be used at home in conjunction with the work at the chair. Most important of all is the fact that the results are permanent. and dentist, be he the average one or the most efficient, can with every degree of safety do this work without fear of any danger to the patient or to himself.

The work of the ultra violet rays are not confined alone to the two subjects above discussed. There are many more possibilities for it in the field of dentistry, I will not endeavor to go into them now, it would take up too much time. My belief is that we have before us a great potential factor which will eventually prove itself a power for doing great good. I venture to predict that the time will come and that very soon, when no dental office will be considered complete without a machine for ultra violet radiation in it.

DISCUSSION

DR. WILLIAM A. LURIE: I believe it is four years ago that my original paper entitled "The Treatment of Pain by the Use of the Ultra Violet Light" was read before this assembly. At that time I did not report any cases of the treatment of pyorrhea, but since then I have had a series of cases of pyorrhea that have been treated with the ultra violet. It is eminently successful and in the hands of a technician or rather one who would properly administer the doses of ultra violet and the careful scaling and cleaning of the teeth, as suggested by Dr. Folstein, there is a greater percentage of teeth that can be saved and made useful than there is in any other means that I have ever had at hand, and such teeth are not apparently dependent upon occlusion alone. As the doctor suggested, occlusion might be the cause of pyorrhea because some of them in which there was a faulty occlusion, have remained perfectly useful for years.

I would say it is now six years since my original cases were treated and some of these teeth are still very useful in the patient's head.

However, there is one thing that I cautioned last year around the round table and that was that we shouldn't be too enthusiastic. Over enthusiasm will do more to discourage a person than a lack of enthusiasm will. If we take things moderately and gradually work into the proper amount of enthusiasm, we will become great enthusiasts of the ultra violet in the treatment of pyorrhea especially.

Leaving pyorrhea and going on to other infections as a medical man, laying aside the possibility of the dentist saving the tooth and making that a useful member as much as we need it, I can't quite line myself up with the idea that a tooth that has once been infected that showed a large area of degeneration apically in the x ray picture can always be for all time a safe entity to remain in the mouth. I say for all time because it can be successfully saved for some time. I could cite a series of cases in that direction, but time won't permit. I am just going to leave you with this one fact, as I stated in the discussion of Dr. Lake's paper, there is a time when any one of us, all of us, can take care of a greater amount of toxin matter, infections or be it what it will, than at some other time, and as Dr. Tyler said yesterday, we have so many units of resistance. If we grant that resistance units number ten and seven are required for something general about the body and along comes another infection or another condition that requires five, we are two units shy.

So that if our seven are taken up by the resistance required to prevent an old infected area from becoming immediately or actively toxic, we are shy two units somewhere, and the best way to get it is to get rid of the seven.

DR. H. M. HALL (New Carlisle, Ind.): There is another thing to just carry what the doctor has said out a little further than that is, when you continue to carry two or three or five of these possible units of infection, you are cutting down the efficiency of the individual for his ordinary avocation in life, and unquestionably in so doing, you are laying the foundation for arteriosclerotic, renal and cardiac developments, and until it is proven to us that this process of treatment (which I hope will be proved) actually does what those x ray pictures seem to show that it possibly was doing, I am seriously in doubt about the advisability of allowing our patients to go on and carry this load of one, two, three, four or five points, even though it doesn't overwhelm him, because it is laying the foundation for shortening his life, besides cutting down his usefulness.

I tell you, men, we have to go carefully about the prognosis we offer to our patients in this work.

DR. I. L. FOLSTEIN (Closing): Dr. Lurie came out with a very fine statement about abscessed teeth.

Gentlemen, I hoped in my entire paper to bring home to you but one fact and that was that when we got through with the tooth that had originally been abscessed, it was abscessed no longer. I hoped to bring out for the sake of Dr. Hall and everybody else, that we in the profession when we started out to combat

abscessed teeth met with the greatest obstacles that we possibly could meet with in the word skepticism. It is one of the hardest things in the world today, and especially so five years ago. Until this day we have not convinced you medical men that when we got rid of the abscess it no longer returned. That is the skepticism we are up against. I have got it from the medical men and dentists. I show them photographs to prove to them that we have no more abscesses once we are through with our work. Yet that idea prevails, that the abscess is there and it has to be there until the tooth is taken out.

I want to tell you ladies and gentlemen that I have seen cases where the tooth has been extracted and the abscess remaind just the same. Here we do the reverse; we save the tooth and get rid of the abscess, and we get rid of it by every sign possible. We see it in the x ray. Every symptom that we can possibly bring to bear is shown and presented to you that the abscess is gone, and I say to you again that there is absolutely no abscess there when the tooth is finished, and it never returns, and in pyorrhea the very same thing prevails, once we get rid of all the pus for you and there isn't a method in use now that can do as much. The very first symptom is the eradication of pus. That is the thing that I want to bring home more than anything else. When we get through with this treatment, the abscess is gone. What you call the foci of infection is gone, and that is the original purpose of my coming here, to try and tell you that there is no such thing as a focus of infection after we get through.

264 E. Broadway.



X RAY SHADOWS THEIR STANDARDIZATION IN THE DENTAL AREAS*

WM. A. LURIE, M. D.
NEW ORLEANS

The regulation or standardization of any process, refines it to a point of common understanding. The more simple and concise such standards are, the more nearly correct are the deductions which result from their observance. The mouth is an important part of our anatomy and has been the subject of greater discussion and more controversy than any other human organ. The chaos existing in this field, instead of being clarified has perhaps been increased since the advent of the dental roentgenogram. The finding of so many "dark spots", "areas of infection", "alveolar necrosis", and "new bone formation", added complications.

This paper is offered in the hope of establishing a standard in value for these shadows, so that the gravity or lack of seriousness of a pictured area can be more easily determined.

It is first necessary to know what should be looked for. There should be a comprehensive reason for the appearance of any changes which may be seen. The days are gone when a hasty decision can be made that a periapical alveolar absorbed area is visible, and that the tooth or teeth about such an area must be sacrificed. The days are coming when you will be called upon to decide when and how and under what conditions such teeth may be successfully treated, and how the newer forms of physical therapy will effect the pictured condition. Not all teeth within an area of pictured alveolar absorption are always responsible for that condition, or the symptoms of the patient. Neither are they all necessarily sacrificed for its relief. It is important to determine, if possible, the virulence of the condition when discovered, as well as to determine its origin, and

amenability to treatment. By the evaluation of shadows, an idea of the type of process taking place may be had, and its proper treatment may be undertaken.

To successfully read a dental roentgenogram it is first necessary to have an intimate knowledge of the teeth, their number, size, shapes and positions, as well as to be able to recognize the changes in teeth due to their normal development. This means that you must understand equally, deciduous and permanent teeth, and the changes pictured during their various stages of eruption. The next requirement is an intimate knowledge of the bony anatomy of the jaws, for in the picturing of these areas the dental film is brought in close contact with the picturable parts, so that many bone details which are easily missed in other skeletal portrayals are here prominently pictured. Failure to recognize what can and is pictured as the normal, is often the cause of unnecessary and serious errors. It is also necessary to understand what alterations in tissue inorganic salt content is the result of a given pathology and symptomatology. How this effects the density of the shadow on the film is important to know. The mastering of these fundamental details puts one in a position to appreciate what changes should be looked for in connection with certain symptoms. It also makes one appreciative of alteration of shadows through natural causes, or, because of pathological processes.

The next important step in the making of a dental roentgenogram of common service to both the medical and the dental profession is to fix a nomenclature and establish a value for shadows which should be common to both professions. It is presupposed that all areas

*Read at fifth annual meeting, American College of Physical Therapy, Chicago, October, 1926.

are portrayed in a manner that is universally approved, and pictured with the minimum of distortion.



Fig. I



Fig. II

Fig. I and II—Compare these two pictures from the view point of the expression of pathology in shadow value. In the first picture, where the tooth socket area has remained unhealed there is a decided increase in grade I shadow, representing soft tissue. In the second picture the cause of the lack of healing of this socket is found in the discovery of grade III shadow value within the alveolar area, absolutely detached and free from any filling in any tooth. This proved to be a portion of filling which was broken off when the tooth in this position was extracted.



Fig. III

Fig. III—Your attention is directed to the great increase of grade I shadow value about the remaining first molar. This is indicative of an acute inflammatory process. Note the increase of the soft tissue shadow about the distal side of the distal root, which represents the peridental membrane shadow, greatly inflamed. Note the loss of grade IIb shadow in the position of the mesial root, and its replacement by grade I shadow. This root was greatly absorbed. An unerupted impacted third molar is pictured.

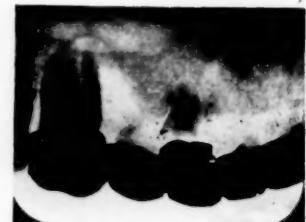


Fig. IV

Fig. IV—Note the different shadow grades pictured. Grade III as the bridge, grade IIa as the alveolar process, grade IIb as the tooth and the portion of tooth root visible in the central portion of the picture, and grade I as the shadow surrounding the roots of the molar, the inflamed area mesial to the tooth and the peridental shadow about the tooth root stump. Reading this picture in shadow values and beginning with the appearance of that portion of the bridge just under the root stump, it is to be noted that there is a greater amount of metal pictured there. The finding of the root as grade IIb shadow value, where, if all the teeth had been extracted indicates that this root may have been an abutment to which the extra metallic shadow was attached. The position of grade I shadow value between the metal and the root, or between grade III and grade IIb shadow values, indicates they are detached. The great increase of grade I shadow value mesially of the molar present, indicates the loss of the alveolus and the extent of the inflammatory process present.

To accomplish standardization one thing is primarily essential. All must have the same understanding of values of x ray shadows. The use of comparative terms on which no standard of value can be placed, cannot be too severely criticised. Transparency is a comparative term, upon which several names or values of x ray penetrability have been built. These terms are more frequently used by the members of the dental profession than by the medical fraternity. I refer to the term radiopacity, radioparcancy and radiolucency. The terms just quoted are not based on any fixed function nor any constant value. These are used comparatively. If standardization is to be attempted, it must be based on some more fixed terminology. Opacity on an x ray film is impossible of standardization. Primarily it is a difficult thing to find two films of the same area apparently equally exposed and similarly developed, which have the same opacity or comparative translucency. So to read

by such a rule is to do so by a very flexible and uncertain measure.

Every area that is pictured is one of what should be a fixed ratio of soft tissue and bone. This ratio is fixed by nature to be the normal. Deviations are possible to still be within normal limits, but the alteration to the extent that soft tissue replaces that of bone or that bone has formed where soft tissue should be pictured, or an alteration showing dense bone or tooth where none should be, is an abnormal finding.

Let us consider for the moment what we all know about the roentgen rays:—Their force of penetration. With the present perfected machines, the penetrating force of an x ray tube can be quite accurately measured, and duplicated at will. This force too, can be made to register by the utilization of the actinic force of roentgen rays to reduce a silver coating on a plate or film. With a predetermined penetrating force and a rather fixed ratio of resistance, that force should register rather constantly. Up to this point there is constancy and there has been some standardization. From this point on, there is the greatest variation, and on such variation is based much of our argument for or against any diagnosis made.

As was said, no two pictures develop the identical opacity or translucency. It is hardly possible to have all the necessary essentials which enter into the development of x ray pictures so equal that these two factors, opacity and translucency, as brought out by the reduction and fixation of the silver coating on the film, can be selected as a standard. We must therefore attempt to correct this fallacy first, before we can go further to establish a standard.

The registered force of the roentgen ray causes a silhouette to be cast on a photographic film. This shadow differs from the usual outline shadow portrayal, in that each body or section of the area with a difference in density, within the pictured area is individually out-

lined. The density of human tissue is rather a fixed or constant quantity. The mouth and jaw areas are also a fixed ratio of organic and inorganic matter. These tissues are either soft or bony. In these areas the tissues assume definite anatomical positions and shape, because of their inorganic salt content. These are characteristic. Because of the differences in the densities of these various tissues their individual characteristics are portrayed. They are pictured in their relative size, shape and position, as an indication of greater or lesser inorganic salt content. The primary cause for difference in shadow in the two grades of tissue is perhaps best expressed by a study of the ash of each. Soft tissue leaves an ash residue of 0.88% inorganic matter while bone leaves a 61.50% of inorganic residue. Four chief inorganic substances are separable in either ash. These are sulphur and the oxides of calcium, magnesium and phosphorus. That these salts are responsible for a variation in penetration is determinable through the picturing of bones of an osteomyelitic patient and those of a normal person, to compare the resistance offered to penetration by both bones. A comparison of the different ratios of inorganic salts in the ash, in normal bone and the osteomyelitic case indicates that calcium oxide and phosphoric oxide are found in 28.55% and 19.55% respectively in normal bone and 15.44% and 12.01% in the ash of the osteomalacia patient's bone. That this slight difference is portrayable can be easily demonstrated. It is therefore perhaps possible to conclude that the registration of the forces, the regulation of which is possible, and which register variously, is due to a variation in the elemental inorganic salt content of the tissues. This is true. The element which varies the greatest in the tissues, is the inorganic salt content. The slightest deviation from the normal is expressed in a change in inorganic salt arrangement, and even slight changes are detectable. The resistance to x ray penetration is dependent on inorganic salts, and their slightest alteration is portrayable.

By establishing the inorganic salt content in tissues as the constant factor in roentgen ray resistance a further step is taken in the standardization of value in shadows. In addition to the anatomical classification of shadows, as soft tissue and bone, they also portray a change indicative as a plus or minus in inorganic salt ratio. Any anatomical area has a definite arrangement of soft and bony tissue. It is also a characteristic and invariable arrangement of inorganic salts. The amounts and arrangement of salts indicates the grade of tissue pictured while its disposition within an area is governed by the anatomic shape and size of the different bodies within the area. This means that the shadows of bony parts are outlined because they are the limit to the extent of inorganic salts of a given concentration, and arrangement. Likewise more or less dense bone is indicated through the picturing of a resistance representing greater or lesser inorganic salt content.

The shadows pictured roentgenographically about the mouth are therefore anatomically of two classes. One as the representation of tissue with a small inorganic salt ratio, and the other as the portrayal of tissue with a high inorganic salt content. These can be termed grade I (soft tissue) and grade II (bone). Grade II or bone shadow is of two varieties. Alveolar bone and dense bone or teeth. Bone grade of shadow must be divided into two classes to differentiate these types. These then are termed grade II class a or (grade IIa) as the alveolar, and grade II class b (grade IIb) for the denser type bone. In addition to the normal animal structures about the mouth, there is often introduced inorganic or metallic foreign matter which is indicated as a greater roentgenographically resistant substance. These are the class of substances used in the treatment and the making of restorations about the mouth. They are often rather heavy and dense metals. They too have characteristics of picturability which are rather constant. A third grade of shadow is therefore defineable. Grade III shadow embraces all of

the metals and foreign substances used about the jaws in fillings and tooth replacements, and root canal treatments.

By the standardization of shadows, and particularly those on the dental roentgenogram, where these different shadow grades are so easily differentiated and so accurately portrayable, a great step can be taken in the recognition of their pathological import. Through the study of anatomy we learn where to look for soft or bone tissue. We know where to find bony canals with soft tissue contents. We know their approximate length and the position and shape of their openings. These are picturable in the living patient in their exact positions. The position, size and shape of anatomic land-marks as are portrayable, must first be understood as an expression of shadow of the different values, that is grade I or II. At any definite age, dentition should approximate a normal degree. This is portrayable as a changing ratio of grade I and grade II shadow as it takes place with development and ossification, which in this instance is the eruption of the teeth. The teeth therefore are of definite number, size shape and position at the various stages of life. Each has its individual portrayal characteristics in the relative outline of bone shadow, (grade II), and the size and shape of the pulp chamber and root canals expressed in grade I shadow. A fixed relation of soft and bone tissue. Its alteration may indicate some pathology. This makes it important to differentiate a normal developmental inorganic salt change, from a pathological alteration.

To continue now to the pathological significance of the alterations of shadow ratios. Instead of the consideration of an area as being more "radiolucent" or radiopaque" than the normal, it should be considered as being the expression of a greater or lesser amount of inorganic salts for the area.

As I have attempted to indicate, pathology as it relates to the jaw areas is portrayed as a

dissarrangement of inorganic salts in the pictured area. If this is true, then it is necessary to recognize pathology, and symptoms as a plus or minus expression of inorganic salts and to readjust their quantities as portrayed shadow values. Further, a study of symptoms as the expression of a greater or lesser inorganic salt content and their association indicate that there is a difference portrayable as the expression of a greater or lesser inorganic salt condition. A little deeper study of this association indicates that acute conditions picture an increase in soft tissue shadow;—a dissarrangement of inorganic salts so that greater penetration through the area is possible. There is a corresponding loss of normal structural appearance for the area.

In further explanation of this thought, there is an association between symptoms and pathological conditions expressed in an increased or decreased calcium index. The relation is maintained in the pictured pathological condition about the jaws, and more particularly in these lesions which are or can be held as a primary focus for the corresponding pathology. If therefore the entire dental areas are portrayed and a number of teeth picture some variation from the normal, those areas which picture a change, in keeping with the calcium relation and the associated pathology, those lesions are to be considered as of greater importance as primary foci, rather than such lesions in which changes do not correspond to the inorganic salt change of the entire body.

It now becomes necessary to correlate the shadow picture with the histological construction of alveolar bone. Alveolar bone when considered as grade IIa shadow is described as bone shadow value or density, with a demonstrable structural formation. Alveolar bone has a definite structure, described as the Haversian system. This is an area of soft tissue, composed of blood vessels and lymphatic tissue chiefly, which is surrounded by a thin layer or plate of bone. The soft tissue is less resistant to x ray

penetration than is the bony wall, so these two structures registering alveolar bone give a mottled appearance to the pictured area, as compared to the dense or compact bone represented by shadow of grade IIb. But this mottling to be normal must represent a definite ratio of the one tissue to the other to portray the normal. This ratio must be in keeping with the gross anatomical appearance of the alveolar bone in a given area, and in keeping with the proven normal histology. That is to say if the cells of the Haversian system are small, as noted about the tooth roots in the lamina dura or if large as noted beyond and away from the tooth apex, they should be portrayed as such and in their proper relative position to be considered normal.

In osteomalacia, a condition in which there is a deficiency of inorganic salts, the alveolar process about the jaws will indicate this variation by change in ratio of grade I and grade II shadow. The walls of the alveolar process are finer and the spaces correspondingly larger. In tuberculosis, where there is an aggrivation of temperature the result of an acute absorption, if that focus is in the mouth it will be in the area that pictures an acute process; a loss of inorganic salt content. Any chronic process about which bone is being formed or about which inorganic salts are being deposited is not responsible for the temperature. In the arthritic cases, where joint surfaces are the seat of salt deposits, the increase of the size of tooth roots, where the teeth are vital, bears no relation to the causitive factor of the condition, but is an indication of its rather general distribution and the involvement of the analogous tissue about the mouth. Here again the teeth picturing acute toxic foci are to be considered as the exciting causes not those as just described.

Time will not permit a minute detailing of all normal and pathological values and ratios, but it is hoped that the description so far undertaken will indicate the possibility of a standardization of shadow values as an expression of normal conditions about the jaws. Let me intimately describe decay and its progress,

in a lower first molar area. Shadow values are used in this description, as descriptive of an increase or decrease of inorganic salt content.

Simple decay on the proximal surface. The shadow contour of the crown of any normal tooth is in the bone value. Normally this outline and extent is in grade IIb shadow value. In the normal tooth, the proximal line should be smooth and regular. The breaking of this straight line and the disturbance of the appearance of a surface which should wholly picture a resistance value of grade IIb (bone), by the appearance of grade I shadow resistance value is the indication that bone density has been replaced by a substance of soft tissue resistance. An indication of a change in inorganic salt ratio. This is true of decay. It is always portrayed in this manner, for inorganic salts are lessened in the area of decay, and their normal compactness is disturbed.

It is easy to note how, if such a cavity is properly filled for the picture should then indicate a complete obliteration of the abnormal position of grade I shadow and the restoration of the broken margin of the tooth by a foreign matter producing grade III shadow.

There are many forms of decay and different fillings are possible which may indicate a good restoration, so it would be impossible to describe these. Suffice it to say that by placing a value on the shadows as seen in the mouth and knowing where each can normally be found, will indicate what the abnormality is, help in its correction and do much to direct its proper treatment.

There is a vast difference in the symptoms which are to be associated with an unerupted or impacted tooth. These symptoms vary, and their variation can be followed through the difference in the tissue ratio as pictured roentgenographically. Thus, a tooth which is unerupted may cause no symptoms. When such a tooth is

pictured, except for its position, which is abnormal, the relation of the bone and soft tissue is otherwise normal. There is a normal size to the soft tissue area about the crown of the tooth, there is a normal thickness to the surrounding periodontal membrane and all the factors indicating a normal tooth and its relations to surrounding areas are normal. Except for the undue pressure that might result from such a tooth, it would be symptomless. Now then undue pressure can be diagnosed, by determining the proximity of such a tooth to a nerve trunk, a bone space or canal. There is no use to describe the symptoms of pressure, for they may be local or referred. Let this same tooth next develop an inflammation about its crown and the symptoms are immediately of a different character. So is there an alteration in the x ray appearance of the area. Inflammatory tissue is soft tissue, and there will be noted an increase in grade I tissue about the tooth. In the chronically inflamed unerupted tooth it will be found that there is discoverable a communication in grade I shadow between that which surrounds the tooth and the gingival crest at some point. In the old impacted tooth where drainage was established after an acute inflammation, there is usually thickening of bone, a greater deposit of inorganic salts to be noted in the periapical area. This indicates that the bone surrounding the tooth apex is altering from a typical alveolar type of grade IIa to the dense type of grade IIb.

The subject of the interpretation of dental roentgenogram is of greater importance than to merely be of diagnostic value for the finding of areas of necrosis. It can be intelligently used for other purposes than to determine the areas of decay and the character of fillings or how carefully a root canal has been filled. However, this necessitates their careful reading and study, and only by the placing of a value on shadows is such reading possible.

In conclusion, it is my opinion that there is an opportunity to put the reading of the

dental x ray film on a standardized basis. The shadows seen are an expression of anatomical entities, which govern the penetration of light in ratio to their inorganic salt content. The problem is to understand the histological construction of parts and the changes pathological processes produce. An intimate study of shadows and their values is an accurate means of diagnosing dental pathology as pictured on the dental x ray film. A better understanding of pathology and its inorganic chemistry is an aid in the association of x ray shadow values and local or general symptomatology as seen on the dental x ray film. I thank you.

DISCUSSION

DR. F. W. LAKE: We must agree with Dr. Lurie when he says that oral x ray interpretation must be standardized. Chaos certainly does exist today in this field.

In the reading of dental x ray films, too little attention is given to the normal structures as seen in the negative, the same is true of angulation. The experienced roentgenologist can determine at a glance just what angle was used, he can also tell all of the superimposed objects. It is true that in x rays of any part of the head, we are confronted with more superimposed parts than in any other part of the anatomy. The time is coming when the physician, as well as the dentist, must determine more accurately than at present what teeth are treatable and what teeth must be sacrificed to clear up some systemic ailment. We readily admit that teeth are responsible for some remote conditions, but we do know that far too many teeth are being sacrificed with no improvement of conditions. As said before, the normal appearance must be known before we can detect pathology.

Clinical symptoms have much weight along with the roentgenogram. To attempt to diagnosis a dental x ray negative without knowing the clinical symptoms is folly.

The terms radiopacity, radioparency, and radiolucency are misnomers and have no meaning other than the ability of the x ray to penetrate a certain area. As Dr. Lurie has said, these terms are not based on any fixed function nor any constant value.

We know that the mouth and jaw areas are a fixed ratio of organic and inorganic salt content. Also, knowing the penetrating ability of these parts by the

x ray, we take a step toward standardization, but these factors must be understood and agreed to by all. Any variation of inorganic salt content is due to disease. (Age, of course, must be given consideration.)

Dr. Lurie's classification of the shadows as pictured roentgenographically carries much importance and until a classification of this nature is adopted by the physician and the dentist, the profession will still flounder around and not be able to arrive at any definite conclusions of the shadows confronted on the dental roentgenogram.

DR. BLUM (Chicago): My experience has been that Dr. Lurie's statements are absolutely true. As a matter of fact I have followed Dr. Lurie's idea of x ray for the last few years.

One point, however, I shall attempt to make clear today, which I think Dr. Lurie did not specify enough, and the way he left off in his talk today is rather misleading to certain extent.

He mentioned this fact about arthritis deformities—that the same condition which exists in other joints will exist in the teeth because of the fact that the teeth by themselves are joints. That is quite true.

He also mentioned the fact that the removal of such teeth in the case of a chronic condition existing in the system is a crime.

To begin with, I think we should consider teeth from a different angle entirely. Tooth structure in itself is the only structure in the human body which does not possess the power of regeneration, it cannot regenerate itself. In other words, a fractured bone will heal if the parts are assembled together in the proper manner. Soft tissue will heal when pathology is not present and sterilization is practiced; then you will have a healing; while tooth structure, once destroyed, does not have a tendency or sufficient power to overcome that destruction. In other words, it takes the dentist to reproduce the lost structure of the tooth. Therefore, isn't it logical to think that the tooth structure in itself is an area of low resistance?

My own experience has been that if you remove the tooth, you very seldom get results whether it is a chronic or acute condition, but by the removal of the tooth and curing of the area properly, you will get results where formerly you did not get results.

I have had experience with jaws where they have been condemned to have their teeth removed, and I have found cancerous areas and by chiseling out the

areas and taking care of them, the patient got well even after having suffered with a chronic ailment.

DR. R. T. LAYMAN (Elizabethtown, Ky.): I had a case two years ago in which the patient's vitality gradually descended. I examined her from head to foot and didn't have ability to find the trouble. I had looked at her teeth and gums. I knew all about her habits. I took her to the dentist and suggested it might be the teeth. He bet me \$1,000 it wasn't. She had beautiful gums and the teeth were in perfect condition. Some had been filled and she had a short bridge, not a knife-jack, however.

I wasn't satisfied. I had her examined by specialists. Some said it was a nervous trouble. Some said a uterine trouble. She had been x rayed and I had her teeth x rayed, and they told us to have twenty removed. When the first tooth had been removed, the dentist said there wasn't a thing wrong with it. When he split it open, the odor was terrific. He said something had happened that he had never heard of before, the tooth had taken a second growth around the nerve and choked the nerve off and it had rotted inside the tooth. They were all that way. I want to know the cause of it.

DR. H. M. HALL (New Carlisle, Ind.): It seems to me that we ought not to let go without further emphasis on the statement made by our speaker of the need of educating not only the dental profession but the medical profession, and those men who do appreciate these important relations between the x ray and the other findings and the pathology existing, should certainly bear down more heavily than is being done at least in the northern part of Indiana about these things to the contrary because many patients are overtreated and many undertreated and many of are badly treated because of the lack of this appreciation.

I could go on and relate a dozen instances of where dentists and doctors have fallen down, but I

just want to mention one thing in regard to x ray diagnosis. Your x ray does not reveal pathology infection until you have rarefaction or a change in density, but you will at that stage get a good deal of aid from transillumination of that area, and checking the one against the other, you will find pathology sometimes with the one and sometimes with the other when either one singly you will not. Your transillumination will not reveal your infection provided you have drainage. It simply reveals a stagnant congestion of the area, but it will reveal that sometimes when the x ray will not reveal it, and the x ray will reveal a drainage infection with your rarefaction when your transillumination will not.

But of all things, we ought to go back as missionaries and keep on being missionaries of spreading the gospel of diagnosis, that is the first thing before treatment can be thought of is the thorough diagnosis of the case and that is what we must work for.

DR. WM. A. LURIE: In answer to Dr. Blum, I would like to say that I still feel that if a patient has arthritis deformities which I specifically mentioned (I didn't refer to arthritic cases where the teeth illustrate the same findings that one finds in the arthritic joint), it is criminal to sacrifice those teeth because I don't believe that the most expert dentist can give such a patient who most likely will gradually lose the proper use of his joints and particularly his joints of mastication, a proper fitting denture that will remain comfortable.

Relative to Dr. Layman and Dr. Hall's remarks, we have all had cases that have shown phenomenal results, and I had hoped, with the assistance of the lantern, to show some that had been in my practice which were miracles, but it would take too long to describe all such conditions, so I must ask your indulgence.

STATUS OF PHYSICAL THERAPY IN THE MODERN HOSPITAL*

WILLIAM H. WALSH, M. D.

Executive Secretary, American Hospital Association,
CHICAGO, ILLINOIS

Foreword

The writer has just recently had the pleasure of hearing at the convention of the American Hospital Association in Atlantic City two masterly papers on physical therapy in which Doctors Titus and Hirsch succeeded admirably in telling us just what physical therapy is, what it does and how to do it. So now that I have acquired all this knowledge I might seem to be availing myself of the first opportunity presented to tell the world about it.

Frankly, I wish it to be understood that my remarks upon this subject are offered from the standpoint of the hospital administrator, and not from that of a clinician, and, I may therefore be pardoned if you fail to hear anything from me concerning the clinical application of the various elements of physical therapy.

Personnel

It is an unfortunate fact that a great many hospitals have expended a considerable amount of money in the installation of elaborate physical therapy equipment upon the advice of members of the staff, only to find that the equipment has been left to deteriorate from disuse. It would therefore seem necessary at the beginning of these remarks to express the opinion that, as an operating room is quite useless without a surgeon, so is a physical therapy department in a hospital without an expert to direct its scientific operation. Physical therapy is just as much a specialty as any other branch of medicine, indeed, it may be said that a physician untrained in the intricate detail of electrotherapy, radiotherapy and hydrotherapy can do

more damage to a patient in the fraction of a second than can the general practitioner who attempts any of the other specialties.

The first advice we give then, to the hospital contemplating the inclusion of a physical therapy department in a hospital, is that a physician trained in this line of work be secured and that he be then consulted about every step in the layout of space and the installation of equipment. By this means large sums of money will be saved, while the hospital will be assured that the apparatus purchased is of modern design, is actually needed, and is secured from manufacturers of known reputation.

Before leaving consideration of the director of the department, it might be well to say a few words concerning his professional relations with his colleagues. It would appear as tho there is a difference of opinion as to who shall prescribe the particular physical therapy treatment—the physician referring the case, or the director of the department. To be sure, questions of this nature are not so apt to arise when the director is an outstanding expert and the members of the staff recognize and respect his knowledge, but, since friction does arise even under most favorable circumstances, it would seem desirable to adopt and adhere to some well defined procedure.

We believe that it is the prerogative of the attending physician to prescribe any treatment that he may deem necessary or desirable for the patient under his care, but, in the case of the application of physical forces, the effects of which are too often not understood by the practitioner, the prescription should be checked up by the director of the department upon the ar-

*Read at fifth annual meeting, American College of Physical Therapy, Chicago, October 22, 1926.

rival of the patient, and, if the director is not in agreement as to the degree or method of treatment, it is his duty to so inform the prescribing physician, at the same time making such recommendations as he may consider proper. In no case should the director apply a prescribed treatment if he believes it to be dangerous to the patient. If a physician should insist upon the application, the director would be justified in calling for a general consultation of the staff.

The ideal method of procedure in a hospital is for the attending physician to call in consultation the medical director of physical therapy for all cases in which there is even a suspicion that some modality might be of benefit. By this means, in friendly conference, the line of treatment may be agreed upon, recorded and then carried out in due course.

In addition to the directing head who should always be a physician, there should be an adequate number of technicians or operators acting under direction, but never upon their own initiative, excepting in the performance of routine functions. The hospital that permits a technician to apply physical therapy in any form without the supervision of a physician is assuming a very grave responsibility, since, in the event of an accident, the authorities could not evade liability on the ground that they had used due care and diligence in the selection of their agents. A lay technician should have no more right in the eye of the law to administer a physical agent of high potential danger, even tho prescribed by a physician, than he has to cut into an abdomen.

Location of the Department

In an old hospital, the location of the physical therapy department must often be determined by the space not otherwise in use. Thus, it has often happened that this important branch of the hospital's activities has been consigned

to a dark and dingy basement, devoid of some of the very elements which physical therapy is designed to furnish. But the devotees of this newer science need not feel aggrieved at this seeming lack of consideration, for most of us do not have to tax our memories to recall that practically every innovation that has marked the progress of scientific medicine has been baptized in the basement, rapidly ascending to glorious heights as its worth became recognized. So, too, the physical therapy department is gradually creeping up to a place where it may utilize good ventilation and an abundance of sunshine.

In new buildings the exact location of the department must be determined with due consideration of all other departments so that there may be exact co-ordination. When there exists an out-patient department, or one is contemplated, the physical therapy department should if possible, be placed upon or close to the ground floor, and in no case on the top floor of the hospital, as the writer has noted in the plans of a hospital now in course of construction.

Equipment

As already indicated, the equipment for a physical therapy department will depend to a considerable extent upon the recommendations of the director on consultation with the staff and the executive officer of the hospital. It must be remembered that the director cannot usually take the initiative in deciding which patients require treatment and therefore it becomes his duty to educate the members of the staff to an understanding of the beneficial results that ensue when the various elements of physical therapy are intelligently applied. The hospital is deeply interested because it has been shown that where physical therapy reaches its highest potentiality, the days stay in hospital are considerably reduced.

Without attempting to specify the apparatus desirable, it may be stated that in any de-

partment worthy of the name, there should be adequate provision of space and equipment for the application of electrotherapy, radiotherapy, hydrotherapy and mechanotherapy.

We have noted in a number of instances that because an expert was not consulted in the preliminary plans, the circuits were not wired to carry the amperage required, and in consequence a complete rewiring job had to be done after the apparatus arrived.

Records

The greatest difficulty is experienced in many hospitals in securing the cooperation of the physical therapy department in the maintenance of adequate records of performance. Perhaps this trouble is due in many cases because the proper blanks are not always included in the clinical chart.

It would hardly seem necessary to emphasize before this body the necessity for insisting upon the most painstaking records of the work that is accomplished in the physical therapy department. Every argument that has been advanced to indicate the need of accurate and complete clinical records in other departments of the hospital applies with equal force to this department and unless this obligation is fully met, the merits of these newer methods of treatment will not be fully appreciated because of the absence of recorded evidence.

Advantages of the Physical Therapy Department

While the development of physical therapy has been one of the great factors in decreasing the period of invalidism, it must be admitted that it has also become one of the greatest incentives to the multiplication of osteopaths, chiropractors and many other brands of irregular practitioners who have made extravagant and unwarranted claims as to the benefits of some special form of physical therapy. This condition of affairs will, we believe, be ameliorated

when every hospital recognizes the place of physical therapy in its armamentarium, and when the leaders in this specialty have devised a means to supply the demand for high grade directors. There are many populous communities in this country with fairly good hospitals in which few, if any, forms of physical therapy are available, while in the same vicinity may be found busy irregulars with elaborate equipment profiting by the indifference of the regular medical profession and the hospital authorities. The first advantage that will accrue to the profession and the public, then, will be the elimination of the irregular practitioner in those communities where the hospital is able to furnish scientific physical therapy.

Physical therapy can be made a profitable department of the hospital, not only from the standpoint of actual financial returns, but also as has been pointed out, by decreasing the stay of many patients in the hospital. Industrial accident cases particularly may be discharged long before the usual period, if the hospital is in a position to continue physical therapy treatment through the out-patient department.

Finally, the hospital that has a complete physical therapy department with an able director in charge will gain great prestige in the community because through that department apparently miraculous cures may be affected; while the injured may be assured of a more perfect recovery from conditions which otherwise would permanently decrease the patient's earning capacity.

The doctors on the staff will soon learn the value of physical therapy, and, as they learn to avail themselves of the valuable forces placed at their disposition, their work will improve in quality and the hospital will more rapidly become what it should be—the center for the application to the sick of any and all curative methods and resources known to scientific medicine.

DISCUSSION

DR. ST. PIERRE (Windsor, Ontario): May I make a suggestion, Mr. Chairman? In the average hospital even those that are standardized we have not yet a proper physical therapy department.

Shouldn't a copy of this magnificent paper be sent to the authorities of a hospital and then they would know how to act and communicate that to the staff and discuss it? I would appreciate it very much if it was sent out.

DR. WILLIAM H. WALSH: With respect to the question on diagnosis, I believe the physician referring the case should attempt to make the best diagnosis

he possibly can before sending it to the physical therapy department for the application of treatment.

As I see it, the physical therapy department is essentially a therapy department for the application of treatment and it should not be taxed too much on the diagnosis. At least the aid of the complete staff of the hospital should be had in making diagnoses.

With respect to the question of distributing this paper, I believe it will be printed. The American Hospital Association would like to give the widest publicity possible to the statements we have made in this paper and we will certainly try to reach your hospital if you will communicate with us.



RELATION OF THE SELLA TURCICA TO ENDOCRINE DISTURBANCES*

MAXIMILIAN KERN, M. D.

CHICAGO, ILLINOIS

Deformities of the sella turcica, due to encroachments or the pressure of tumors arising from the pituitary itself, or from structures in its immediate vicinity, are well recognized clinical manifestations, but doubts arise when we seek to connect definite deviations from what we considered normal sellae, with mental deficiency and other conditions which we claim depend upon disfunctioning of one or more glands of internal secretion.

My personal view is these two findings can be definitely associated. In this I disagree with the expressed views of others who have found no differences in the sellae of normal and abnormal subjects.

In order to substantiate my theories and to refresh your memories in regard to the historical aspect of this question I shall cite abstracts from the literature on this subject.

Frazier classifies pituitary tumors as follows:

1. Those of pituitary disfunction without enlargement.
2. Suprasellar lesions.
3. Pharyngeal-pouch tumors.
4. Primary pituitary or intrasellar lesions.

The vast majority of these last-named tumors are adenomas and the most of them show pressure symptoms, while the minority show endocrine symptoms. With atrophy of the dorsum sellae and the posterior clinoid process the characteristic deformation of the sella is lacking, and this information, which is so helpful

in differentiating between an intra and extra-sellar lesion, is not available. With encapsulated adenoma the sellar floor may have disappeared wholly by pressure atrophy or may only be of egg-shell thickness.

The lesions which arise from disturbances of the pituitary gland in general are:

1. Lissen: (2). Acromegaly, gigantism, hypophyseal infantism, post-adolescent hypopituitarism.
2. The Lawrence-Moon-Beidl Syndrome: (adiposo-genital syndrome, associated with mental retardation and retinitis pigmentosa).
3. The Christian Syndrome: (Combination of exophthalmos, membranous bones and diabetes insipidus).

While I do not wish in this paper to go into questions of the functions of the pituitary gland or of its components, I should like to remark that obesity may arise from changes in other glands than the pituitary; that, while cretinism appears to be undoubtedly associated with the thyroid, the Lorain type of dwarfism is now connected with the anterior lobe of the pituitary; and that the obesity in Froelich's Syndrome is an indirect result of the disturbance of the inhibitory action exercised by the pituitary on the gonads.

Daily (3) remarks that pituitary tumors which are growing only down into the sella do not give eye symptoms—that only those growing above the sella give such symptoms. There are many cases of acromegaly without eye symptoms. A tumor has first to grow large enough to fill the cisterna before it touches the optic chiasm.

*Read at fifth annual meeting, American College of Physical Therapy, Chicago, October 21, 1926.

We will now pass to the consideration of the sella turcica as a distinguishing part of the pituitary. Enlargement of the sella is a most important guide in the recognition of pituitary tumors. The normal pituitary may vary in size and produce normal variation in the size of the sella. In intrasellar tumors the sella may, and often does, extend into the sphenoid sinus. The back of the sella is pushed backward, thinned and there may be destruction or erosion of the anterior clinoid process.

For purposes of differential diagnosis, tumors of the parietal lobe and optic thalamus and hydrocephalus also show enlargement of the sella.

The great majority of pituitary tumors are adenoma of the anterior lobe; chondromas are rare and arise from sphenoid cartilage rests. The spinal cord, in the embryo, ends in the back in the sella, and tumors arising from rests here are called cordomas.

Harvey Cushing (4) whose book on the pituitary is an accepted classic, considers the sella turcica in connection with pituitary and neighboring enlargements. He distinguishes three types of pathologic deformities and enlargements of the sella:

1. Those associated with thickening of the clinoid process and dorsum epiphii.
2. Those with thinning from pressure absorption of those parts.
3. Those with more or less destruction of all outlines.
4. There are many sub-varieties. The first type is confined to cases of acromegaly and gigantism uncomplicated by adenomatous struma formation, although there is nearly always some evidence of pressure.

The second variety may occur in acromegaly but is far more common in advanced hypopituitarism, associated with a primary glandular struma.

The third variety shows more or less complete absorption of the dorsum and a downward dislocation of the base; the sellar landmarks, with the exception of the anterior clinoid processes, being effaced.

This change may be brought about either by the transformation of a primary glandular hyperplasia into the type of malignant struma or by the downward pressure of an interpeduncular growth which deforms and absorbs the subjacent sphenoidal bone by its progressive enlargement. Cushing thinks that the chief difficulty in radioscopic interpretation is unquestionably met with in cases of superimposed extra-pituitary growths. Equally important and more difficult to interpret are the abnormally small sellae which accompany the primary glandular hypoplasias of the young.

Timme (5) considers the question of pituitary hyperplasia more especially from the standpoint of glandular therapy. He says that the three important criteria that serve to distinguish those cases of pituitary hyperplasia which are amenable to glandular therapy from true neoplasms, which are in no way so amenable are:

1. Previously operated or other critical disturbances of gonads.
2. Status thymico-lymphaticus, preceding the pituitary syndrome.
3. Long-standing thyroid insufficiency (i. e. pituitary gland compensation).

Pituitary headache and oculomotor disturbances are probably due to encroachment upon the sinus cavernus and its nerves by an enlarging tumor. Radiograms show erosion of the

clinoid process of the sella, or an extremely small sella. The sella gradually enlarges by compensatory hyperplasia of the gland.

Benign adenomas or other tumors may arise in the hyperplastic masses but in true neoplasm of the pituitary body glandular therapy has no influence.

I wish to emphasize the fact that, as the normal sella undoubtedly shows many varieties while well within the range of normality, very great discrimination is necessary in ascribing any type of sella as pathognomonic when it is found in a subject with some manifest endocrine dysfunctioning. Only the study of large series of such cases with the constant association of the two conditions would justify their causative connection.

This, of course, is quite apart from the effect of glandular therapy upon the tissue of adenomatous or other tumors.

Gordon and Bell's (6) roentgenologic study of the sella turcica in normal and abnormal children has attracted considerable attention. The report is a roentgen ray study of 64 children with abnormal conditions, i. e. mongolism, myxedema, infantilism, etc.

The same authors, in May, 1921, reported the roentgen findings in 104 normal children in order to establish normal sellar conditions for comparison. The following conclusions were then reached:

I. The shape of the sella turcica in normal children falls generally into three groups:

- a. Circular.
- b. Oval.
- c. Flat or saucer-shaped.
- d. Modifications in each group.

II. There is a marked variation for each age in both height and length of sella for that

particular age. There is a rapid increase in both for the first two years, with a gradual increase up to twelve years of age.

III. There is no relation between the shape of the sella and the size of the head, except in the flat type, which was always found in flat heads; but not all small heads show this.

IV. There is no apparent relation between size of the sella and size of the head.

V. There is apparently no influence of sex on either the appearance or formation of the sella.

My own study of 64 abnormal children, compared with the normal children, showed that the shape of the sella does not differ significantly in normal and abnormal children. The type of disorder is not correlated with the shape of the sella.

The formation of the sella does not differ in abnormal children from that in normal children. There is no formation characteristic of any individual disorder. The excavation that has been described by Timme in Mongolian idiots is extra-sellar.

The size of the sella is not influenced by any of the disorders mentioned. The disorders studied were; Mongolian idiocy; hyperthyroidism; thyroid infantilism; hypopituitarism (obesity, Froelich's Syndrome and cases with hypothyroidism); micro and hydrocephalic idiocy; epilepsy, moron; and muscular dystrophy.

In regard to the reference to the Timme excavation, Stevenson and Stulz, (7) in a radiologic study of Mongolian idiots, found that Timme's excavation is present in children and usually disappears with development toward maturity; its greater pronouncedness in Mongolian idiocy is a corollary of the peculiar facial arch and generally delayed bone development.

In considering many of the pathologic conditions, which are usually classed as arising from pituitary dysfunction, it is well to point out the very important experimental researches by several authors. The researches and findings of Roussy and Camus (8), especially for some years past, pretended to dispossess the pituitary body of some of its supposed functions and to ascribe them to the tubercinereum. The role of the anterior pituitary lobe in the skeletal growth and in dwarfism and gigantism is definitely established. The polyuric syndrome is not hypophyseal.

In the adiposo-genital syndromes and obesity pathologic conditions in the hypothalamus probably co-operate more or less.

Treatment of Pituitary Gland Tumors and Hyperplasias

I am of the opinion that the logical treatment of conditions arising from hyper- or hypo-secretion of the pituitary body is by glandular therapy; i. e., by direct medication which inhibits or checks pituitary secretion in cases of hyperfunctioning. The question of determining the exact part of the pituitary body which is at fault is, of course, one for nice discrimination of the symptoms. A study of roentgenograms under my observation shows interesting changes after glandular treatment was carried out.

I might state here that Harvey Cushing (9) expressed the opinion that there can be but little doubt concerning the therapeutic effect of extracts of the structure primarily at fault. His experiments on animals justified this opinion.

As regards treatment of tumors themselves the roentgen rays have been found much more efficient than surgery.

The successes obtained by Beclere (11) (and probably also by other writers) are par-

ticularly in simple hyperplasias and adenomatous tumors developed in the anterior lobe.

Gramegna, (10) of Turin, Italy, was the first (in 1909) to report a recession in the size of a growth and the disappearance of symptoms following the action of x rays (through the mouth) on pituitary tumors. Shortly after, Beclere made a similar report. Beclere later on rayed the frontal and temporo-frontal regions. He reported 40 cases of primary pituitary tumor with acromegaly and claims favorable results in all cases, some of which have been followed by ten to twelve years without a return of symptoms. Several other authors report similar experiences in either single or small series of cases.

Beclere states that in advanced pituitary tumors there is a regressive destructive process which causes a pituitary insufficiency. In acromegaly and gigantism this insufficiency would be manifested under the form of muscular weakening, falling of the hair, drying of the teguments, loss of weight and arrest of hyperosteogenesis. In these cases irradiation would be contra-indicated. Some authors absolutely discountenance irradiating tumors of the posterior part of the cranium. Owing to the very important role which the resistance of the organism plays, a considerable fall in the number of leucocytes or a fall in hemoglobin ought to serve as contra-indications.

Flateau, (12) collected reports of 90 pituitary tumors irradiated, with 88 ameliorated or cured. He states that Beclere found 78 per cent ameliorated or cured in 150 tumors so treated. He shows by a study of the effects of surgical treatment of such tumors that hardly 2.9 per cent of cerebral tumors are operable and that there are hardly more than 3 to 4 per cent of durable cures. Some surgeons, however, claim up to 16 per cent cured or showing very good results.

Conclusion

1. If a radiologic study of the sella turcica and nearby structures is to be of any value, it must be conducted by a man who has had a wide experience in observing films of both normal structures.

2. Radiologic findings must always be correlated with clinical studies in arriving at a diagnosis and prognosis.

3. Glandular therapy is decidedly useful in the treatment of pituitary dysfunctions and benign enlargements of the gland, but is valueless in true neoplasms.

4. In the treatment of pituitary tumors the results following the intelligent use of x rays are far superior to those obtained by the most expert surgery.

References

1. Frazier, C. H.; *Atlantic Med. Jour.*, Apr., 1926, P. 435.
2. Lissen, H.; *Ann. Otol.* 1926, XXXV, P. 856.
3. Daily, L.; *South Med. Jour.*, June, 1926, P. 485.
4. Cushing, H.; *The Pituitary Body* 1912, P. 238.
5. Timme; *Atlantic Med. Jour.*, Apr., 1925, XXIX, P. 427.
6. Gordon, M. B. and Bell, A. L.; *Endocrinology*, July-Aug., 1925, IX, P. 265.
7. Stevenson, G. S. and Stultz, A. D., *Arch. Neurol. and Psychiat.*, 1923, X, P. 299.
8. Roussy and Camus; *Ann. de Med.*, Paris, 1925, XVIII, P. 407.
9. Cushing, Harvey; "The Pituitary Body", 1912, P. 313.
10. Gramegna; *Rev. Neurol.*, Paris, 1909, XVII, P. 15.
11. Beclere; *Rev. Neurol.*, Paris, 1922, XXXVIII, P. 888.
12. Flateau; *Rev. Neurol.*, Paris, 1924, I, 23, 176.

30 North Michigan Ave.

DISCUSSION

DR. CURRAN POPE (Louisville, Ky.): One of the first essentials in the study of the pituitary and the sella turcica radiographically is to get a correct radiogram, and that is just as essential as in housekeeping in the blue grass region to get your rabbit first before you try to make your stew, so you must get an accurate view and accurate radiogram of the skull and this requires very careful mechanical leveling and centering of your tube.

We find in children one has to be very careful about reading plates, in the first place because of the lack of complete deposition of lime and in the second place many irregularities that appear apparently on the plate in children seem to disappear in later life.

There are numerous variations in size, if I can judge from my own limited experience, that we cannot really say we have a pathological condition. In fact, I have never been one of those who attempted to read the pathology of the sella turcica in the pituitary from a radiogram. I always think that the essential condition of the individual and those conditions that are pointing toward pituitary disturbance should have very, very great weight when we come to study the radiogram. I don't know Dr. Kern's method, but we have tried studying these skull pictures by different shadings of light and we have found very frequently we can get better views from a large blue bulb at times than we can from the plain lamp; that is, in your reading box. Those are just little points that oftentimes help you to see more clearly and if one will go into the room and read a plate of this character the room should be very dark in my opinion and the eyes should be allowed to rest just like you were going to make a fluoroscopic examination, and then the plates studied from all angles.

There is no question in the world, in my opinion, about these two things of which I am going to speak. One is that there are a great many cases of epilepsy

that are undoubtedly due to disturbances of the pituitary and the sella turcica. The next statement is that while we can in glandular therapy oftentimes get some excellent results, there is nothing to approach in value the use of the x ray and I believe the x ray has a very great future in the treatment of these conditions.

I want to say that about twelve years ago, probably a little longer, I saw a woman suffering from an incipient acromegalic condition. There was no question about the diagnosis clinically, none whatever from the radiogram. I think any one could probably have guessed what the condition was from the radiogram. We roentgenized that lady, if my memory serves me correctly, for about seven or eight months off and on. She couldn't be a regular attendant. She was teaching school some little distance from Louisville but at the end of that time (we had been measuring her constantly) evidently for four months there had been no increase and the disease seemed to be at a standstill. I have had the rare opportunity of measuring and re-measuring this lady during the last twelve years, I think it is now, and there has been absolutely no advance of the disease and in fact the woman is clinically better than she has been in many years.

I had another case of this character of a young man who was epileptic and he had had, I think, about everything on earth you could think of. When he came to us I was away at the time and my associate made a very clever diagnosis of pituitary epilepsy and didn't tell me about it. When I came back I made the same diagnosis.

In his case we have gotten wonderful results. In the first place we believe that there is a difference in the sella turcica at the present time from what it was in the original plate. I could best describe it by saying that I think there has been a clearing up of the appearance of the sella turcica in the plate, but clinically that young man is well. I say clinically because he has gone something over a year, maybe longer, without any medication whatsoever and simply being kept under observation to check up the work.

I am one of those who believe that in these cases the physician should constantly watch the patients, should explain to them that in this type of case the observation and the treatment must run over a long period of time if any good is to be obtained, and if any one will study the so-called cases of epilepsy, or the epileptoid states as I am pleased to call them, those cases of epilepsy that are really irritative or toxic convulsions, but which get well from relieving phimosis or correcting some other condition I do not consider them

genuine epilepsy. I do consider any epileptic condition that rises from trouble in the pituitary or the sella turcica to be a genuine epileptic condition but we have found that no drug medication did anything but harm in these cases.

I have been experimenting just a little bit in the last years in the combination of three modalities. That is to say, the diathermy, galvanism and the x ray in the treatment of these disorders, but I don't care yet to make any statement of what I have attained.

DR. EDWIN KIME (Indianapolis, Ind.): I would like to present a contrasting viewpoint concerning the anterior and posterior lobes of the pituitary. It follows out somewhat what I have been talking about and yet I wasn't definite enough about in my own mind to put it in my paper.

The posterior lobe of the pituitary is developed from the nerve system. The posterior lobe of the pituitary has vasol constrictive properties that stimulates smooth musculature in a little different way from an adrenal which produces constriction from the terminals of the nervous system. Pituitrin of the posterior seems to act more directly on the smooth musculature itself. Nevertheless, we know that we have definite stimulation of the smooth musculature from the use of the posterior lobe extract.

It seems to be possible, or probable, that the posterior lobe of the pituitary could be aligned somewhat along with the adrenal, the thyroid and other glands of internal secretion. The anterior lobe, on the other hand, is probably developed from the endoderm. If you will take a skull and look at the base of the sphenoid bone you will find a little depression on the base of the sphenoid which is the lower end of the primitive cranial pharyngeal canal and from that was developed what I believe was Rathke's pouch, the anterior lobe of the pituitary body which from my viewpoint is endodermic in origin and as we are led to believe from the literature is anabolic in its activity. The anterior lobe of the pituitary body has given, according to Robertson of California, a substance which stimulates growth and when it is overactive from the very beginning we get general systemized gigantism, and if it remains under-active or normal up until adolescence we get post-adolescent hyperpituitarism in the anterior lobe with enlargement of peripheral bones, bones that have not as yet ossified, the enlargement of the jaws and the typical appearance of post-adolescent hyperpituitarism of the anterior lobe.

To clinically differentiate these states is of course extremely important, and Dr. Kern has gone into that;

but I would like to indicate that we have certain fairly definitely known states to be considered, adiposogenital dystrophia, which is connected with both lobes, and then there are the asthmatic states which are presumably due to under activity of the posterior lobe of the pituitary body.

You will probably see lots of references in the literature on the uses of pituitary extract in hay fever, in various of the asthmatic and so-called allergic phenomena. That brings us back to the sympathetical topic, the mechanism that I spoke about awhile ago.

Then we come to a final condition, pituitary diabetes. You will see a reference of this condition in the literature. There is some evidence to make us believe that in some ways the posterior lobe of the pituitary body acts directly antagonistic to the pancreas. In other words, that they are antagonistic endocrines and that if you have an under-active pituitary body then you will have an over-active pancreas with an increased sugar tolerance. If you have an over-active pituitary body you then will have a restraining influence upon the pancreas and a decreasing sugar tolerance.

I would like to talk longer on this phase of the subject, but I would just like to ask Dr. Kern if he has any definite information upon the comparative morphology of these two portions of the pituitary body particularly with reference to the development of these two areas in the lower forms and whether or not the presence of sunlight, of actino-therapy, of ultra violet radiation, and so forth, would have any influence on the pituitary body comparable to that which we know or at least we are pretty sure exists on the other glands.

DR. W. A. LURIE (New Orleans, La.): I rise in appreciation of Doctor Kern mentioning my name in the ideas that I propounded in the reading of roentgenograms and adopting them to the interpretations such as he has made.

In the following of that though, the most important thought of what I believe I have demonstrated relative to the apparently insignificant dental area is the

act that it is the reading of the direction in which the disturbance is taking place which makes the association of the shadows that you see with symptomatology so important.

Relative to Dr. Pope mentioning the reading of an increase of shadows or details in shadows with a blue lamp, I would suggest to those interested and to Dr. Pope that at times he change from the blue to red, or using a blue on one eye and the red on the other in his glasses and he will be surprised at the increase in the detail which his pictures will show.

I think the most important thing to those who are practicing physical therapy that grows out of Dr. Kern's paper is the fact that symptomatology may be varied with a variation in pathology. The pathology is not easy to find; it is very difficult to find. However, with the finding of it we must be careful in the use of our different therapeutic modalities because we have definite effects, definite results to offer with each little thing that we do, and when we go at it haphazardly we may be doctoring the wrong thing at the wrong time.

DR. REUBEN LAVINE (Oswego, N. Y.): I don't quite recall whether the speaker has taken up the indirect findings on the x ray plate in lesions around the sella turcica. There are three or more definite, distinct x ray indirect findings that we can usually see on an x ray plate. In the first place there is evidence of increased intra-cranial pressure. One is diastasis of the sutures of the skull; and second, marked prominences. If the tumor is large enough to press on the bones of the skull you will also see an erosion of that bone evidenced by lightening the shadow of the bone at that particular spot.

In lesions around the sella turcica there are other indirect findings on bones of the skull which are very marked, with marked prominence of the frontal bones, enlargement of the cheek bones and marked prominence of the jaw.

DR. MAXIMILIAN KERN (Chicago, Ill.): I wish to thank all those who participated in the discussion of this subject.

ULTRA VIOLET RADIATION*

E. N. KIME, M. D.

INDIANAPOLIS, IND.

Every therapeutic application of light should be considered as an experiment in biology. Every scientist knows that in every experiment it is necessary to have at least one constant factor. If you deal with more than one inconstant factor, interpretation of the experiment is of no value. Our constant factor in light therapy is the agency itself. My successor on the program will go into the physics of this matter, but I should like to state beforehand that I am limiting my discussion to the activities of the shorter wave lengths, those that are shorter than 4000 Angstrom units.

By selective filtration, such men as Pacini, Hess, Weinstock and various others, working individually, have shown that it is this zone of ultra violet energy shorter than 4000 Angstrom units which is responsible for one thing, phosphorus metabolism which runs along hand in hand with calcium; and other mineral metabolism, notably iron and manganese.

There is a still shorter zone of ultra violet radiation which instead of being more systemic in its effect, and thereby stimulating metabolism, is markedly irritant and more or less destructive to protoplasm, whether that protoplasm be human or bacterial.

There is some evidence to show that this energy has a more selective action upon bacterial protoplasm; but, be that as it may, we know that this zone, 2550 Angstrom units, is irritant in its action and bactericidal in its effect.

If we are dealing with a standard quartz mercury vapor generator of the air-cooled type,

*An extemporaneous lecture given at the fifth annual meeting, American College of Physical Therapy, Chicago, Oct. 19, 1926.

we will get this energy (pointing to longer wave lengths) and if we deal with a water-cooled ultra violet lamp, we get plenty of that energy (pointing to short ultra violet rays.) Remembering the Bunson-Roscoe law; viz. the effect is equivalent to a constant, times the intensity, times the time, we can interpret our results along the line of intensity and time factors. However, we must not forget that we are dealing with a variable factor in the subject which we are treating, animal or human protoplasm. Protoplasm is that substance which makes up all living forms and of necessity is constantly changing; it is never the same.

In a general sort of way we may be able to estimate before hand, according to the clinical type of the case we are dealing with, that a certain reaction will occur, but, nevertheless, we should not forget that the human body is a compensatory mechanism, and an energy transformer attuned to its environment; these factors are constantly changing, and no one is qualified to judge as to that except the regular licensed practitioner of medicine.

What is our chief objective criterion of the action of these rays? It is the erythema which is produced. It is true that there are many subjective effects; it is also true that by objective tests, basal metabolic rate, blood chemistry, blood counts, and so forth, we can get objective data upon this effect. However let us consider something that every one can see, even without the assistance of a laboratory—the erythema, the reaction that results after exposure to these actinic rays.

After a mild exposure, we have first dilation of the blood vessels in the superficial layer of the corium. This does not follow immediately after exposure. Histological sections do not

show an immediate change in the blood vessels, but it follows at a time which varies with the intensity of the original radiation. The more severe the radiation, the quicker the erythema, but we do get a dilation of the blood vessels. This produces the flush or erythema, a reddening of the skin. This is followed by an exudate of serum, microscopic at first. In severer radiations, it is gross. In heavier radiations we have then more advanced histological changes. We get marked dilation of blood vessels; we have heavy infiltration of serum and we have swelling of collagen fibers, interference with the normal keratolytic processes of the skin, cornification and even vesicles and bullae. These are the histological changes we see, and if we just think about them a moment, we will see that they are the changes that are practically synonymous with irradiation; with inflammation the reaction is irritation.

Primarily we do not have vasodilatation but subsequently in this histological picture we do get vasodilatation. Primarily then we have vasoconstriction probably, followed by a later compensatory vasodilatation. It is about the same sort of a picture that you get in the anaphylactic protein shock reactions, urticarias and that sort of thing. We have probably an increased permeability of the endothelial capillaries with the extravasation of serum, pressure upon nerves and even destructive effects upon the overlying epithelium. Later we have the pigment formation which is presumably a reactive manifestation on the part of the adrenals. This throws the picture back again onto the sympathico-tropic mechanism or the mechanism dominated by the sympathetic nervous system and the catabolic glands of internal secretion.

Those of you who have read Emerson's essays will realize that he insists that all through nature wherever there is life we have duality of phenomena, wave length motion alternating, and so on; in physiology, alternating systole and di-

astole, alternating expiration and inspiration; in chemistry, biochemistry, alternating anabolism and catabolism, alternating potential energy production in the body and kinetic utilization.

If we follow the phylogenetic picture, begin with the protoplasm as a single cell, we see that animals feed themselves as a single cell through their skin; that the greatest reaction occurs in protoplasm through the superficial ectoplasm of that form. As we climb the animal scale, we see that differentiation of structure to provide for specialization of function gives us an enfolded skin area which assumes the function of providing for the nutritional needs of this more complex organism.

Finally we get to the vertebrates, where we have an inner tube and an outer tube; the inner tube derived from the entoderm chiefly, the outer tube derived chiefly from the ectoderm and somatic mesoderm. The inner tube we use to provide energy to the body; the outer tube we use to dissipate this energy, to spend it, to put it into kinetic activity.

We have this differentiation firmly established—two portions of the body embryologically, anatomically, physiologically distinct. These two portions of the body so far as their involuntary activities are concerned, are under the control of a neuro-chemical mechanism. In the case of the entral portion or visceral part of the body, it is stimulated by the parasympathetic nervous system and those glands of internal secretion derived from the entoderm; on the other hand, the outer or kinetic tissues are stimulated by the sympathetic nervous system and the catabolic glands such as the adrenals thyroid and so forth.

How can we utilize all this embryological data in interpreting what this light will do for this particular patient? In what way can we make a practical application of all this? Many times we are going to get reactions from light

therapy which are entirely unexpected. We are going to see cases of asthma in which we have a bronchial spasm, (frequently in the literature claimed to be an anaphylactic phenomenon, an over-activity of the parasympathetic nervous system mechanism.) If we use a heavy radiation of light on that patient and destroy a lot of skin protein and that patient immediately has a very severe asthmatic paroxysm, we wonder how it came about. I think that the following is the explanation; that a severe radiation in these anaphylactic cases will give you a compensatory over-activity of the parasympathetic system which you don't want.

Let's take a few cases. Inasmuch as Dr. Goodman is a dermatologist, I will more or less leave that field to him. I am not a pediatrician, but inasmuch as many of you are expecting something about pediatrics in this regard, I will quote you from some of my experience in light therapy with children, first in regard to calcium, phosphorus and iron.

Here is a child, the daughter of a dentist, age three, overweight, undermetabolized, anemic and definitely rachitic. We have there a lack of metabolism all along the line—calcium and phosphorus, iron and general metabolism lacking in rickets. This child developed a severe compensatory reaction in the form of fever and was brought to me a very sick babe.

The treatment of that case was calcium by mouth; iron by needle and very cautious systemic ultra violet. The hemoglobin raised, was elevated from a preliminary picture of forty per cent to one of sixty per cent in less than three weeks and then up. The rachitic manifestations gradually disappeared. The hair, which has been rubbed off at the back of the head, came back; the teeth erupted and the child became healthy and made complete recovery and is now all right.

I might incidentally mention that this child's mother is at the present time receiving

systemic ultra violet from me because of her pregnancy. She doesn't want to see the oncoming child develop a similar condition to what this one had. She is an intelligent patient and cooperates well.

Here is another child. This will emphasize not only iron metabolism but also immunity mechanism. A boy aged four was sent to me by a surgeon. He had osteomyelitis of the mandible, extensive abscess formation of the entire jaw. His jaws were so swollen that they almost reached his shoulders. He had sinuses on either side at the angle of the jaw and inside the mouth. His teeth were loose. X ray, however, showed no definite bony sequestrum. It is a good surgical rule, I believe, not to operate upon these mandibles unless there is a definite sequestrum, and a surgeon asked me to give this child systemic radiation and nothing else. That is what he got.

In the first month there wasn't much change except his marked anemia began to disappear. The child, by the way, was almost moribund when I first saw him. In the second month of radiations, (these were given every other day, starting with very minute doses and gradually coming up) the sinuses closed on the inside of the mouth, and the third month the abscess condition gradually subsided, and about the end of the third month the mother brought the patient in to me one morning and said, "See, Doctor, what little George pulled out of his wound himself this morning." There was the articular process of the neck and a large part of the ramus of the mandible. Nature's own method had performed for us an arthrectomy. Remember that he still has his periosteum intact and he may regenerate bone sufficiently to take the place of that which has been lost. I might say, incidentally, that no interference with mastication occurred in this case.

Here is another picture that is all too common, that of a child of early school age, white, pallid, weakly, with scrofulous enlargement in

the glands of the neck, a chronic nasal pharyngitis or ethmoiditis, if it wasn't too early, and chronic bronchitis. I have seen those children gain weight; their glandular enlargements subside in a most remarkable way. Their immune mechanism is stimulated; their iron metabolism is benefited; their calcium metabolism is benefited, and the whole proposition is one of a steadily progressive utilization of vital energy by this child.

Suppose we took that child and gave intensive heavy radiations, what would we be likely to do? Remember that this child is already in a state in which it is very easy for him to slip over into a toxic condition; perhaps secondary infection already exists; frequently there is an incipient tuberculosis which could easily be lighted up in the over-activity caused by heavy radiation. Remember that in all catabolic states, over-activity of the thyroid or adrenal, or toxemia, secondary infection, advanced tuberculosis, we must be exceedingly cautious in the use of heliotherapy or quartz light therapy. On the other hand, in those conditions in which we have an anaphylactic state, a tendency towards improper reaction to proteins, our light therapy is almost a specific. It can be used just lightly, also thyroid extract and calcium in the chronic dermatoses of tuberculosis, the early forms. You can use it to stimulate metabolism of the skin. This phase of the work I will leave to Dr. Goodman. I am sure he will be able to tell you of some of the splendid results we get in eczemas, urticaries, chronic infections of the skin.

I want to leave you with this thought that the human body is a compensatory mechanism. It has been derived from its environment; it remains attuned to its environment and not the least of all, environmental energies from the very beginning of existence as life on this earth, has been ultra violet radiation.

DISCUSSION

QUESTION: How do you administer calcium?

DR. KIME: Calcium may be administered as calcium lactate; it may be administered as calcium iodid. There you get the beneficial effect of the iodin, of its synergistic action as a catabolic agency. I have a paper, by the way, on calcium and ultra violet in which this is largely taken up. I might say, incidentally, that I have learned to give a great deal of calcium intravenously for the simple reason that many times we realize that calcium is not sufficiently absorbed, not quickly absorbed or not absorbed early enough. Our ultra violet seems to act very efficiently in calcium metabolism by increasing the assimilation of calcium from the bowel. So if you do not want to use intravenous medication, give it by mouth and ultra violet to aid it in assimilation. Use calcium-rich food—milk, cottage cheese and that sort of thing.

DR. L. V. DAWSON (Amarillo, Texas): I would like to know the complexion of the patient and what method you have for pigmentation. The reason I ask the question is this: I had a parallel case of a little blond child. I got no results from the ultra violet because I was never able to produce an erythema, even with thirty minute raying.

DR. KIME: The failure to produce erythema in a blond child with a thirty-minute radiation might be interpreted in a number of different ways. In the first place, I take it for granted, Doctor, that your lamp is an efficient one.

DR. DAWSON: A Burdick.

DR. KIME: I didn't mean to bring out any particular style over another, what I meant to say was whether or not it has been in use for some time or whether it is a new one. Of course, we know that burners lose in their efficiency with age.

Here we have a beautiful control that produces erythema elsewhere and does not in this blond child. If the erythema production and if the pigment production fail, it is an expression of adrenal underactivity. That phase of it ought to be looked into. Do not forget, men, that in a general sort of way we can expect an erythema from almost any patient, yet there are these instances which only prove the rule that the matter of clinical judgment is important. It is not necessary for a patient to always develop an erythema in order to obtain beneficial results, although Rollier and others maintain that in their experience they find a definite relationship between the quantity of pigment formation produced and their clinical response.

DR. G. A. REMINGTON (Chicago, Ill.): What form of iron do you use?

DR. KIME: Iron may be used by mouth in ordinary pills or it may be used intravenously in the form of iron alone or iron and arsenic or as iron citrate injected by needle. There is a question for the physician to determine himself, depending upon the particular patient that he has to deal with. It is very difficult to lay down an absolutely hard and fast rule of technic in all these cases. Remember we are doctors first and physical therapists second.

DR. TURBIN (Madison, Wis.): I would like to ask the Doctor what technic he uses in a general radiation and what you call a heavy radiation.

DR. KIME: In a general radiation we use the air-cooled lamp and that is kept at a sufficient distance from the patient, depending upon the particular efficiency of the lamp you are using and the particular style that you are using. In my particular lamp I use not less than thirty-five to forty inches distance from the patient's body with a voltage of seventy and a time factor which varies with the color of the eyes largely. In my experience, you can determine better as to blond or brunette, by the color of the eye than you can by the particular complexion of the skin.

DR. TURBIN: I mean the general radiation. Do you expose one spot or the whole body, or do you take a part at a time or the whole body at one time?

DR. KIME: I expose the entire body except in cases in which there is a question as to pulmonary tuberculosis. If there is any question as to pulmonary tuberculosis, I think it is unwise to expose the entire body at a primary radiation. There the zonal method of Rollier, which Rollier applies to heliotherapy, is very good. Unless there is a question of tuberculosis which you may light into activity, it is just as well to expose the entire body.

DR. EDWARD TRIPPEL (O'Fallon, Ill.): I would like to ask the Doctor in giving these medications, for instance he referred to giving iron and arsenic and these metallic substances in an inorganic form, if he is getting better results by getting the elements in the organic form, in cauliflower and red salmon and those things, and also if he has had experience with combinations of Shaffer's cell salts where the protein is used.

DR. KIME: I have had no experience with Shaffer's salts. With regard to iron in the organic and inorganic form, of course that is a question of clinical judgement. I usually use it in the inorganic form but insist that the patient get as much hematopoietic substance in the food as possible.

DR. CARL S. WILLIAMSON (Fairmount, Ill.): I would like to know what injury I am doing my lamp by turning it on shortly after I turn it off. That is either my air-cooled or water-cooled. I have been told it is injurious to turn it on again before it cools off. I have been told I should keep the hood closed.

DR. KIME: I would be glad to talk with you about that personally. I hardly believe it enters into the discussion.

DR. L. J. KOMINSKY (Texarkana, Tex.): In connection with the case of the blond, don't you think if an individual has a diabetic condition he will not react with erythema as much as one who does not have a diabetic condition?

DR. KIME: I am glad you introduced that subject. Remember diabetes is a disease in which there is a deficiency of the islands of Langerhans. The islands of Langerhans are developed from the endoderm, the same as digestive gland epithelium, although in reality an endocrine agency. Remember that the secretion from all the entodermic endocrines is directly opposed in its biochemical action to that which is derived from the ectodermic endocrines. Therefore, you would expect in diabetes to have bizarre and unusual results. As a matter of fact, theoretically in advanced cases of diabetes one might consider ultra violet to be entirely contra-indicated.

DR. KOMINSKY: The reason I asked is that I have had that experience. I could get no reaction and I made a thorough examination of the kidneys for sugar and I found that to be a fact.

DR. DAWSON: This child didn't have diabetes. He had a stool examination, complete urinalysis and blood chemistry and blood count and he was normal all the way through.

DR. KIME: It only indicates we must be doctors first and physical therapists second.

GALVANISM IN CERVICAL SUPPURATIONS*

J. U. GIESY, M. D.

SALT LAKE CITY

Suppuration in the cervix like other suppurations depends upon infection. The treatment by galvanism depends upon three things. first: the vasodilating, tissue softening, drainage inducing effect of the negative pole. Secondly: the sterilizing, vasoconstricting and tissue hardening and tonic effect of the positive pole. Thirdly: the ionizing effect of the galvanic current.

In cervical conditions, anatomically speaking, there is a canal lined with columnar epithelium. This is a point I wish to stress, because upon it hinges a great deal of the success of treatment.

In infective conditions of the cervix per se, there is a penetration of the infecting organism. In this lies the crux of the entire technic. We have been frequently told that the best way to treat these conditions is to insert a copper or zinc sound of a size to fit the canal, and turn on a positive current of a certain number of amperes for a certain time, and then pull it out. In some cases it is true that this will give results. But I believe there is a better technic. This consists in applying old principles to the case. It is a known principle of surgery, that in fighting infection the first thing is to establish drainage, provided there is suppuration. One may establish drainage by opening the cavity it is desired to drain, or—one may establish the effects of drainage by exciting an outward current of osmosis, or what amounts to osmosis by exciting exudation from the infected field.

Here one takes advantage of the known action of the negative pole in producing vasodilatation. One takes advantage of its softening

effect on the tissues, and its electrolytic quality of attracting fluids toward itself. By inserting this pole first into the cervix, and obtaining its effects upon the local field of infection, one softens the tissues, incites serum exudate and draws the water molecule into the diseased structures, with what amounts to drainage as the result.

After a few treatments of this nature for a preliminary effect—a clearing of the field by drainage, plus the further effect of destroying the local epithelium in a large part through the local effect of the negative pole, one continues to treat the condition by reversing the poles for the further course of the case. And now you obtain the tissue tonic effects of this pole plus its ionizing effects as well. Copper or zinc may be used or the amalgamation of either with mercury by dipping the active electrode into a little acid first; dipping it into liquid mercury next, and then rubbing it down to a smooth surface. Either way you get ionization of the metal used. The penetration is not deep, but it is apparently deep enough to reach most of these conditions as experience has proved.

TECHNIC

Place the patient upon the table, insert a speculum, exposing the cervical os. Insert the active electrode in the cervical canal. Have a large disbursing pad on the abdomen or under the lumbar back, or if preferred, in both locations. Start the current slowly and build up. Do not try to start with a high milliamperage at first. Let the patient herself develop a gradually increasing tolerance. From twenty milliamperes the first time to thirty to fifty the

*Read at fifth annual meeting, American College of Physical Therapy, Chicago, October, 1926.

GALVANISM IN CERVICAL SUPPURATIONS—GIESY

second or third. From then on, the milliamperage increased to sixty or seventy which usually is quite sufficient. Some have asked if the sound will not stick in the canal. It certainly will. But—if it does—all one needs to do to loosen it is to reverse the current for a minute or two and it comes out easily enough. With the weaker milliamperage it can be removed without trouble. Of course in the first few treatments when the negative pole is being used as the active electrode, it will not stick.

DISCUSSION

DR. A. DAVID WILMOTH: Dr. Giesy has very briefly covered the subject so thoroughly that there is very little else to say. For the benefit of some of the beginners we had hoped to have some specimens this morning, showing that you can actually drive the metals into the tissues by the action of the galvanic current. Unfortunately our specimens haven't arrived.

The type of sound (I take it he uses the same thing), is the old fashioned copper applicator with which you are all familiar. This has several sized tips that can be used in the cervix.

He is perfectly correct in his application of the current here, in order to obtain drainage, to reverse the flow, so to speak, of the lymph. In many cases this forms a most admirable start for future treatment. Then follow up, as he says, with the use of the positive pole, beginning with low milliamperage and stepping it up through succeeding treatments to the degree you wish.

It is necessary to have a smooth current. If your machine gives a rough current you will be compelled to use a low milliamperage because the patient will not tolerate as high a dosage as from a machine which is smooth.

If you amalgamate your sounds, always close the joint between staff and tip with a bit of adhesive plaster or shellac. If you don't, the acid will eat the threads of the connection and ruin the instrument. You can coat the sound with mercury which I think is a most excellent way of treating these cases. If you want to know whether your current is doing what we say it will, look at the instrument and you will find that the mercury has been deposited in the tissues. Seldom do the instruments stick when they are amalgamated with mercury. It lubricates the instrument, makes it easy to introduce and prevents its sticking up to 40 or 50 milliamperes.

The thought has occurred that possibly the use of the silver sound is not too expensive. We have been using a silver sound made from virgin silver. We have been driving the silver into the tissues. You know most of us now-a-days use some solution of silver salts as an antiseptic. After a number of months use, I believe that the silver is deposited more rapidly and with a lower current than that with which you can deposit mercury or copper. With 10 to 15 milliamperes on the positive pole you can deposit quite a quantity of silver in the tissues. I think the silver will give more prompt effects, with less current than we get with the ordinary copper even though we amalgamate it.

I know the question is going to arise in some one's mind as to the monetary side of the question. Some perhaps might be inclined to think that you treat a case a few times, and it gets well, and you have lessened your income from a patient who would otherwise have come a number of times for local applications. I assure you that this is well balanced on the ledger by the number of grateful patients who go out and bring in their friends. The method far surpasses the cautery. Some of you who have been in practice for years remember the old cauterizing method of incising the cervix, anteriorly and posteriorly, and laterally, with the actual cautery, then after ten days or two weeks, when reaction had subsided, incising again as nearly as possible midway between the first incisions. You will perhaps likewise remember that this was discontinued because of the scar tissue produced by the cautery, and I assure you that the method Dr. Giesy has given us far surpasses that.

DR. C. H. MORIAN (Denver, Colo.): In view of the fact that the infection may extend the full length of the canal, I would like Dr. Giesy to state whether it is necessary at times to insert the electrode the full depth. Also, how does surgical diathermy in the condition under discussion compare with the use of the galvanic treatment?

DR. J. U. GIESY: I want to say one thing in regard to ionization. After you have amalgamated your sound with mercury and have run your current the given time decided upon for the individual treatment, do not be surprised if you find that not all the mercury has left the sound. If you are giving a short treatment, you cannot expect the mercury to disappear completely, because there is a certain ionization rate for every metal so used. You will however get sufficient ionization to be effective.

As regards cauterization, that method is not used extensively now except in the form concerning which

Dr. Morian has just asked—as an application of surgical diathermy, which is nothing more nor less than a modern modification of the old cauterization technic, consisting of the use of an active point electrode connected to a high frequency machine, to stripe the infected canal to a degree sufficient to bring about a superficial coagulation. This method offers a reasonably quicker means of gaining the same end result. It is apparently working out very well. I have used both methods in selected cases with good results.

As to the full length insertion of the sound, if you have a full length infection of the cervix the chances are that you have an endometritis as well. In a case of that nature I treat, not only the cervix, but the endometrium also, going clear up to the uterine fundus with my electrode and following the same technic already described, first the negative, then the positive for its after effect.

DR. LUCY DESAULNIERS (Lewiston, Maine): I should like to ask whether it is necessary to have the tip of the sound insulated or not. Which is the better way?

DR. GIESY: The instrument I am using consists of a long silver wire, tipped with a small ball about the size of a radish seed. This is connected to a hard rubber staff and the length of the wire is covered with a slip insulation of rubber. After the electrode is inserted the slip insulation is shoved up to contact with the cervix. Thus you have complete insulation of the tissues except those it is desired to contact. As to whether the tip should be insulated or not, I personally do not use an insulated tip. The main thing necessary is to use care and gentleness in manipulation and place the instruments exactly where you wish to produce the desired effect.



EDUCATION IN PHYSIOTHERAPY*

NORMAN E. TITUS, M. D.
NEW YORK

In the teaching of medical students, the first thing that I believe we should do is to impress upon the medical students that they must finish their medical education. At Columbia University the teaching of physical therapy is given to the students in their fourth year. The fourth year is divided into quarters, as is the class, and they rotate through four different sections of surgery, medicine, gynecology together with obstetrics and one quarter of the year is spent in studying the specialties. This is when the men can select to study what they will. They can take up two or three courses in urology if they wish to, two or three courses in neurology, in eye, ear, nose and throat work or any specialty they wish to follow. It is in that quarter that they are given a chance, if they want to take it, to listen to the lectures that I give in physical therapy.

It has really been very gratifying in the last two years. For the last year, for instance, out of a class of 110, I have had about ninety-six of the students attending my lectures. The year before there were about 140 in the class and there were about eighty who took the lectures. So that the medical students are interested in what physical therapy can do and they want to hear something about it.

The idea of the course is *not* to teach them how to practice physical therapy. I impress upon the students that they are attending the course of lectures which has no examination, merely a series of eight meetings of the class to hear the theories of physical therapy and to understand what we can do, to understand how simple the procedures are, to know that in using physical therapy we are trying to aid medicine

*Extemporaneous talk given at fifth annual meeting, American College of Physical Therapy, Chicago, October, 1926.

and surgery and not compete, so that when they get out of the medical school and get out of the hospitals if they care to go into physical therapy, they then have some fundamental knowledge and when they start in they can start in really as post-graduates such as they would in any specialty they might take up.

Therefore, I keep down all specially scientific knowledge and special points in technic. I do this because some years ago I went to a hospital to see what they had in the line of physical therapy and I saw a high frequency machine there. The chief surgeon was taking me around and I said, "I am glad to see you have such a machine in the hospital."

He said, "We don't use it; it is no good. This stuff of high frequency is absolutely no good. We just kill our patients. We had an intern here and he knew all about it and we gave him cases to treat and he burned four out of five cases. It isn't any good."

That is the reason I impress upon those students that they are not to know how to run a machine, they are not to know the technic; they are to know theory the same as they know the theory of medicine and surgery. Consequently, when they go to the hospital, the opportunity, as you might call it, will not be wished on them of treating patients because they know something about the machines. They will make a mistake and the surgical or medical staff will say it isn't any good because they didn't get results.

That was one instance brought to me, so I endeavor to keep them from the knowledge of actual technic and take up merely the theoretical side and reduce it to the simplest A, B, C, I can. Incidentally, there is no book written that

could be called a primer in physical therapy. It is all right for us to speak about spark gaps, voltages and amperages and resistance and all that which we understand.

When a medical student is getting theory day after day and you try to tell him something that reminds him too much of his college physics, he just lets it slip by and takes no interest at all. So I impress upon them if they care to later on, they are fitted to take it up as a special education, the same as if they were going into some other specialty such as urology, neurology, or eye, ear, nose and throat, after they have graduated.

The course given the undergraduates repeats each quarter of eight weeks. The lectures are given once a week and the first meeting of the class consists of a lecture of introduction. They are told of the general scope of the work, the definitions of physical therapy, what we want to do, what we hope to do and how we want to show the place that physical therapy has in the general team work of therapeutics.

The second meeting of the class is a demonstration of apparatus. I started out first to have the first meeting of the class a demonstration, but I found the men had no idea of what I was speaking. So we now have the second meeting a demonstration of apparatus where the students themselves feel the galvanic currents, the faradic currents. They feel the good galvanics and the poor faradics and they feel the high frequency currents. They feel static electricity and see the difference between carbon filament lamps and deep therapy lamps, the difference in light given from them. They see experiments with ultra violet, they see the experiment that Dr. Nagelschmidt taught me fifteen years ago of coagulating albumin with two poles of the d'Arsonval current in a rubber dish. This is a very interesting experiment.

One experiment I might tell you about which you can do yourselves and which d'Arsonval showed me to prove inductance is easily

demonstrated. I have never seen anybody else do it and I have never heard of it being done. He makes a circle of ordinary copper wire, connects the two ends to binding posts on a little porcelain socket and puts in a six-volt bulb—an automobile headlight bulb or something like that. Then he takes the two cords from the terminals of the high frequency machine, connects the two together, and brings them out and makes one entire loop. When the high frequency current runs through those cords and the wire ring when a lamp is brought into the field of that solenoid that is created, the lamp lights. You can put towels over it and pillows over it, any way you want, and as soon as you put the ring in the field, you demonstrate what inductance is. You can talk to students and doctors for a long time and say that a current passing through a wire induces a current in another, but you can't prove it to them in a more simple way. If you hold the ring at right angles, the lamp will not light; if you bring it out of the field to any extent, the lamp will go out. I know many among you do teaching and there are a lot of little experiments you can use. That is one of the most simple ones.

During the demonstration the men are shown how we light the lamps, the mercury arc lamps, how carbon arc lamps are lit, what an electric light bath cabinet is, what a whirlpool bath is and the different hook-ups for the static machine. For instance, the static brush discharge can't be given the wrong way. If your patient isn't correctly connected, you get no effluvium. The students also feel what the static current is like. This gives them an insight into the construction of apparatus. I have a high frequency machine I can take apart; I show them the solenoid, the Leyden jar condensers, the transformer, the choke coils and other parts like that. So in later talks about the subject they know just what I am speaking about.

The third meeting of the class is a lecture on the subject of light and ultra violet, the gen-

eral subject of actinotherapy. That is rather hard to cover in an hour because there is so much to talk about. Of course, you can go into the deep chemical side if you want to, but with the students it isn't worth while because you want them to understand a few of the laws of light and a few of the uses of light and the indications and contra-indications.

The fourth meeting of the class is for the consideration of the low voltage currents, such as the galvanic and the sinusoidal. I explain what the faradic current is and why it isn't much of a current and the different variations of these currents, their applications, indications and contra-indications.

The next meeting of the class is devoted to high frequency electricity, explaining to them what the high frequency currents are, how they are generated. They have seen the machine apart, they know what the different parts are and it is easy to explain when they know what is inside the box. The actual application of these currents is not gone into very much. I don't tell them about the technic of applying diathermy or the different methods of applying the current nor do I speak very much of the surgical side.

In New York one of my good friends insists that endothermy is a great thing. So I have to go into the differentiation between the high frequency currents generated by a machine with a spark gap and the currents that are generated by a machine with no spark gap but a three-element vacuum tube used to give sustained oscillations that makes the cutting current. That is necessary because they see endothermy demonstrated before they get to me and I want to arrange it so they are not confused about the difference between the damped and undamped waves that can be used in high frequency.

The next lecture is devoted to static electricity and the final lecture is devoted to therm-

al therapy, hydrotherapy, massage and remedial exercise.

If the session is of eight weeks, that is stretched over or we finish up with a series of questions at the end. I can tell ahead if we are going to have eight weeks and I tell them to make up their questions during the course and at the last meeting we will answer questions and explain things that may be puzzling to them.

In that way they get a rather good knowledge and I think by the attendance, which has not been required, (there is no attendance taken, it is an optional course and there is no examination) the undergraduates appreciate something of the uses of physical therapy.

The post-graduate course at Columbia University consists of six weeks every afternoon except Saturday from two to five. It is rather hard to cover the whole subject in that time. The Dean suggests that we spend two weeks on theory, two weeks on demonstration and two weeks on practice. So the men spend two weeks, that is a total of twelve lectures on theoretical work, twelve lectures on demonstrations showing how the currents are handled and the technic and the final two weeks are spent on one week of experimenting on each other and one week of treating patients. That course has been rather well attended, in fact too well attended for my personal comfort, because six weeks, every afternoon away from your office is pretty hard to handle.

Regarding the teaching of technicians, I can't speak from any experience in that because it isn't done. I don't know of a good place in the country such as connected with any university, except Stewart's school in New Haven where the technicians are taught. Speaking about technicians, I might draw your attention to that word. I have heard it spoken in this meeting of these valuable assistants, you might say our hands in this work, called Aides. The old name was Aides, (used in the army); they

were called Physiotherapy Aides. When we considered the teaching of these nonmedical assistants at Columbia (and we hope to be teaching them in about a year) I spoke of the designation as aides and the Dean suggested the "aide" is an improper word to use. We would not want them to go around as aides because an aide typifies a volunteer assistant in a hospital. In any hospital in New York anywhere an aide is an assistant to a probationary nurse. We have laboratory technicians and other expert technicians that are really essential nonmedical assistants, and he thinks they should be called Physiotherapy Technicians.

I merely speak of that because I think they appreciate it more and they like to keep their profession a profession of dignity and particular usefulness. The designation Technician gives them more standing than just being an aide in the hospital.

As I said, I know of nobody who has really taught technicians. That has been discussed. We have theorized on it and outside of the training that the government gives them in Washington, there is no real big effort that I know of. I believe there is some done at Leland Stanford University and some other places undoubtedly may have started since I got the information.

The government felt in training these technicians that, especially in taking care of the wounded, they must be girls of particularly high character and of good education. Dr. A. B. Hirsch, of New York, who is very much interested in this subject of training technicians has written a great deal on it and says that we should not take scullery maids and ex-cooks and others of that character and educate them to the grade of the physiotherapy technicians as we like to have them today. The government requires that they shall have had a high school education as a minimum. In fact, a large percentage of the government technicians during the war were college graduates. In Australia,

New Zealand and in Ceylon, the British government requires of a girl who wishes to study to be a physiotherapy technician or a grade such as that, (I have forgotten exactly the designation) that she shall be a college graduate when she finishes. I know in Australia particularly and in New Zealand that the courses are given as a university course and when a girl finishes that course and fulfills her requirements, she is given a diploma from the university with as much dignity as though she had been there and had become a bachelor of arts.

It is necessary that these girls have good heads. They have hands, they can give treatments that we can not give individually and personally ourselves. We must know they have good, level heads to carry on what we desire. Therefore, with an educational background of a complete high school course, and it is more preferable to have them also have a course in some school of physical training or some medical gymnastics, with a background such as that, it is not hard to train the technicians into good, competent workers. Of course, you might say probably the minority, the blessed minority can be trained even without that physical education and probably without a full high school course, but it is good to have a minimum requirement. That is what the government asks and what I think we should ask when we begin to train them, because we want good, sensible people to work with us.

Another thing is that when they are paid, they should be paid a saving wage and not a living wage. They should be encouraged to save from the pay they get. I can't give you exact figures now beyond the fact that the government pays from \$1650 to \$2400 a year. Chief Aides, as they are called in the government service, get \$2400 and sometimes \$2500 a year. They get maintenance and their laundry. So they have a chance to do a little more than just make enough money to scrape along on, and we must figure in hospitals that when we

have a technician, a chief technician for instance, that she is the house surgeon or the house physician on service and she must get the consideration and the dignity the same as a member of an intern staff would get.

In teaching the technicians it is very necessary that they understand physics. They must get some physics, especially the physics of electricity, and we have had that in our preparatory courses whether they may have had it or not. The physics of electricity is necessary, for instance knowing the density of the current on the electrodes when they are giving galvanism or high frequency treatments and they must also know that when we prescribe 300 milliamperes for a patient in a diathermy treatment, we mean 300 and the patient is not going to get better if she gives them 600 and says nothing about it. They must understand enough of the physics to know that we know what dosage we want the same as if we are giving a dosage of a medicine.

A course in anatomy is necessary because they must know where the muscles lie; they must know surface anatomy; they must know something about the location of the larger blood vessels and the nerves. That is necessary for them in massage and it is also necessary for them in muscle testing, although in muscle testing generally the director of the department has that wished on him and he does not remember the motor points. I don't think anybody in this room knows all the motor points. We generally have a blue chart hanging in front of us and we work by the chart, so we can not expect the technician to remember what we ourselves do not remember. They have to know anatomy for the application of electrodes.

I was very pleased to hear Dr. Kolischer say in treating sacroiliacs it was necessary to use a mesh or a soft, pliable electrode rather than a stiff one because of the bony points be-

neath. A technician should know that. It is possible that somebody in the hospital might order a treatment where the technic would be the improper one and the technician should know that and she can only get that through some anatomical knowledge.

The medical education can be given by assistants, younger members of the hospital staff. In the curriculum arranged now for Columbia, we have younger members of the staff to teach the technic of physiotherapy. I think this covers the subject of training.

The only other thing is that the technician should know the etiquette of his or her position. She should know that she ranks as a nurse and she is not to talk back to doctors when criticized. I had an example in Beekman Street Hospital last year. One of the younger members came up and told a nurse she didn't know what she was doing when giving interrupted galvanism to a paralyzed forearm. He came to me and complained that she didn't even answer him back. It showed how ignorant she was, he said. I called her in and asked her to ask him some questions and he went out of the office "with his tail between his legs", because she showed him up as being much more ignorant. She said she couldn't talk back to the doctor.

They should also know something about taking of records. Records are very important things. We are going to build up our work in physiotherapy by keeping accurate records. We have to have records that show what we do, how to do it and when we do it. Speaking about records, this is beside the point as far as the hospital department goes. We should not make diagnoses; we should not waste our time in that. The patient should not be admitted to our department without the diagnosis already made and all the clinical data submitted to us, with the requirement of our department stipulated on a tentative prescription, but the actual direction of treatment is up to us. We will in

time be able to build up records of cases. In two years and a half at Beekman Street Hospital I have had almost 3000 cases of which I now have complete records. Some day when I get time to sit down, these records will mean something. If anybody starts a department going, don't forget to keep your records; keep your cross-diagnosis file; keep your records for your own department and keep in step with the hospital records so your records without conflict will be included in the regular hospital histories.

One final point is that a technician should know how to handle all kinds of apparatus. I know a New York hospital where they have one nice, old lady who has been there for years and years, she walks around and turns on the lights and turns them off. That is all she knows and she gets forty dollars a week for it and they are

kicking about the expense of their department. You can get a time switch to do that.

It is very necessary that every technician knows how to understudy everybody else for they may not always stay with us. I expect some of my friends will get away my prize technicians I have; they will pinch them some day and they must be prepared to handle all work, they must know all about ultra violet, low voltage currents, static, massage, light and high frequency and know the whole business so that they are really true assistants to us.

I hope that this purely extemporaneous talk will be of some slight help and that the education in Physical Therapy will spread yearly.

40 West 51 Street.



EDITORIAL

ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM

A Journal of Ideas and Ideals.

A. R. HOLLENDER, M. D., Editor
Suite 820-30 North Michigan Avenue,
Chicago, Illinois

Original contributions, exchanges and books for review should be forwarded to the Editorial Office. All business matters including advertising should be handled through the office of the managing editor, 1216 Medical Arts Bldg., Omaha, Nebraska.

ALBERT F. TYLER, M. D., Managing Editor

The statements made in the manuscript published in the Archives of Physical Therapy, X Ray, Radium, are made solely on the responsibility of the author. Neither the American College of Physical Therapy nor the publishers assume any responsibility for statements contained therein.

Manuscripts accepted for publication in Archives of Physical Therapy, X Ray, Radium, are for exclusive publication and may not be published elsewhere.

Subscriptions—In the United States, its possessions and Mexico, \$5.00 yearly; Canada, \$5.50; elsewhere, \$6.50 the year.

Advertising rates on application. All advertising must conform to American Medical Association Rules.

Payments for subscriptions and advertising must be made to Radiological Publishing Co., in New York or Chicago Exchange.

Published monthly at Omaha, Nebraska, by the Radiological Publishing Company.

Sixth annual meeting American College of Physical Therapy and Clinical Congress on Physical Therapy—Hotel Sherman, Chicago, October 31 to November 5, 1927.

PHYSICAL THERAPY IN RELATION TO THE STATE MEDICAL SOCIETY*

I think there is a very definite reason why special organizations should be interested in the basic medical societies of this country. By basic

medical societies I mean the county medical society, the state medical society and the American Medical Association. The county medical society in America is the backbone of organized Medicine.

I want to impress upon you the importance of your supporting whole-heartedly your county medical society. I want to talk to you about the relationship of your specific organization which evidently is a real, high grade organization or else since since the time of its beginning, if I mistake not, September 18, 1922, you could not have organized an organization which would have as representative an evening meeting as this meeting. Any man who has watched the development and knows anything of the history of medical societies in this country must admit that an organization of this type to develop to the extent it has in four years must have real merit.

Now this evidently is an important branch of medicine. Dr. Nagelschmidt has told you that it has been neglected in Europe. Certainly physical therapy has been neglected in America. Unfortunately, I personally know little about physical therapy but I can tell you two or three reasons why I know that physical therapy should be studied and studied very carefully. In the first place, only with an organization devoted to the study of some specific thing will you ever make observations and bring forward work which will put physical therapy on a thorough scientific basis.

I can say without fear of contradiction from anybody that physical therapy must be and is of real value. Another thing—Physical therapy

is a thing that should be recognized and accepted and engaged in by medical practice or else it will slip away from the adherence of organized medicine without any question. There is value in it, so medicine certainly should take it up. I think that the general attitude toward physical therapy today is very much different than it was a very few years ago.

I am going to quote you two things said by Leonardo da Vinci in the Fifteenth Century. He said, "Instrument or mechanical science is the noblest and above all the most useful." I take it that we may apply that to a certain extent to physical therapy. He again said, "Science comes by observation, not by authority." I take it that this organization by observation will produce real results.

I am here as an individual. I happen to be an officer in the greatest medical society in this country. I might quote you something that may interest you. One-thirteenth of the organized medicine in the United States is in the state of Illinois.

I am going to ask two questions, because I am going to answer them as shortly and in as few words as I can. First, whence came you? Second, whither are you bound

Whence came you? Gentlemen, you came from organized medicine and you are a part of organized medicine. My plea to you is never to allow the interest in your specialty to so enamor you that you forget your county medical society. The county medical society needs every man here, it needs every physician in this country, particularly it needs the men who have ability and the willingness to do the specialties in medicine. Now there is, unfortunately, among certain classes of men who are doing specialties the feeling that it is below the dignity, and I think I have sensed it in certain organizations that it is below the dignity of these organizations to consider the economic questions of med-

icine. Gentlemen, unless we all consider the economic side of medicine, medicine will be in a bad way. I appreciate the fact that medicine will live; it has lived for centuries it has a fine past and it has a wonderful future, but it is up to you and to me to protect that future. As I said, I think there is among some special societies the desire to lose sight of the economic side of medicine, possibly because the men who are in specialties have become more or less successful. The men who are attending this meeting obviously must be a little more successful than the rank and file or they wouldn't be here.

That reminds me of a story that I am going to tell you which was told in the Russian play "Dibbuk" which was played here last winter. A rich man entered the synagogue. He was taken by the hand by a rabbi and led to a window. After he looked out a while the rabbi said, "What do you see?"

He said, "I see people."

The rabbi took him by the hand and led him to a mirror and he said, "Now what do you see?"

The man said, "I see myself."

The rabbi said, "The only difference between the mirror and the window is a thin coating of silver."

Gentlemen, I make a plea to you, don't permit that thin coating of silver to cause you, to lose interest in the place from which you came—organized medicine.

There are plenty of medical societies, there are going to be more organized. The other day I looked over a list of medical organizations in this country and I really think there is a logical reason, I thought day before yesterday when I was at the Crerar Library going into that there was a logical reason for this organization, now I know by the representation shown here that there is.

Whither are you bound? History demonstrates that the success of medicine in the past shows that we will have a successful medical body in the future. We don't want to be discouraged by the cry of commercialism. I don't know whether that disturbs the physical therapist or not but certainly certain branches of medicine are more or less disturbed by the cry of commercialism. But that thing has gone on since the beginning of time. There hasn't been a lack of the irregular practitioners since the beginning of time. The irregular practitioner has been with us always and he always will be, because there is going to be somebody who will climb in your kitchen window if you leave it open. To demonstrate to you that commercialism has been with us for many years at any rate, Garth in 1699 said, "How sickening physic hangs its pensive head and what was once a science is now a trade." Two hundred years ago some man saw that.

The general public is interested in medicine. There isn't any question about it. Many men in medicine have not yet appreciated that the general public are interested in it. To demonstrate to you why I think the general public is interested in medicine, I will say first that the lay press is the foundation of interest for the American people. It produces the interest. Since January 30 there have been at least three editorials in a magazine which I think has the largest circulation of any magazine in this country along the line of medicine. In the January 30th issue of last year nearly the entire editorial page was covered by an editorial along the very line that I am talking to you. If you haven't read it, I ask you to read it; it will be of interest.

I have two clippings, one from an editorial in the Saturday Evening Post, and I am going to read you just a little of it because I believe that I can sell my merchandise better in that way than any other.

"We can not be too grateful to the scientists and physicians who work for humanity. A man of large affairs supposed to be chiefly interested in finance and industry astonished his dinner companions one evening by asserting that the greatest man in the United States is one of whom most of them had never heard, a medical consultant in an eastern city. Perhaps the halos should be transferred from statesmen, explorers, actors and prize fighters to this and other medical leaders. Yet this wisdom is still in its beginning. Even the common cold is like an unknown plant. If man's intelligence is measured by his absolute knowledge of his diseases, is it feeble."

Another that I clipped from the Tribune, and I presume the Chicago Tribune has the largest circulation of any paper in the Middle West, is as follows: "The research laboratory has again and twice within two days made news, it is news far more important to human welfare than the news of an electron or a strike or a business merger."

People are interested in medicine and we must tell them about medicine and we must tell them straight about it. People want to know about it.

Roosevelt said, "Every man owes a portion of his time to the advancement of the profession of which he is a member." I wish that I could get you all to believe and to live by that statement that man owes a portion of his time to the profession of which he is a member. The individual who does not do something for the welfare of his profession, and I don't mean alone scientific medicine, I talk economic medicine tonight, is a drone to say the least. Remember, gentlemen, that the physician should be a citizen, not alone a physician but a citizen.

In closing I am going to read you one little verse from Kipling:

"It ain't the individual, nor the army
as a whole,
But the everlastin' team work of every
bloomin' soul."

—G. Henry Mundt,
Pres. Illinois State Medical Society.

NEW MEMBERS

Fortunately the numbers in the college have increased to such an extent during the past two years that solicitation of new members is now to be restricted to those who are vitally interested in the promotion of physical therapy on a highly scientific plane. If such men or women are available, the college welcomes them with open arms. There are unquestionably many physicians in North America who would be glad to qualify for fellowship in the American College of Physical Therapy but need some enlightenment on the real purpose and work of the college. Active fellows should appoint themselves on committees to seek those who are in this position and to apprise them of the advantages a college fellowship offers.

We do not want numbers. We want numbers if thoroughly qualified. Let us join hands in surveying the material available and make a united effort to obtain at least one hundred new

fellows before the fall meeting. Last clinical congress brought over one hundred new applications unsolicited. This year's will bring many more. The annual clinical congress and school of instruction is well worth while from the standpoint of postgraduate work in physical therapy for the busy doctor. This year fellows will pay no registration fee to the congress. Everybody pays for the instruction work.

ONE HUNDRED NEW MEMBERS BY NOVEMBER FIRST. LET US GET BUSY. But remember—each one must meet the entrance conditions of the college before acceptance.

A CALL TO THE FELLOWS OF THE COLLEGE

The program for the fall clinical congress is in the August issue. There are, however, a few available places open for men or women who wish to present reports of either laboratory or clinical investigation. In other words, the papers must be on original work done. The reason for this is that a sufficient number of clinical papers are already available. Please communicate at once with

Chairman, Convention Committee,
Suite 820—30 No. Michigan Ave.,
Chicago, Illinois.

THE STUDENT'S LIBRARY

BOOKS REVIEWED

APPRECIATIONS AND REMINISCENCES OF SIR WILLIAM OSLER. Bulletin No. LX, International Association of Medical Museums. Edited by *Maude E. Abbot*, M. D. Cloth. Pp. 633. Privately issued at 836 University St., Montreal, Canada, 1926.

Appreciating the indebtedness of the International Association of Medical Museums to the inspiring work and achievements of Sir William Osler this work was instigated. The volume was begun five years ago with the point in view of presenting the relations of Sir William Osler to pathological anatomy and the influence of his pathological studies and researches upon his development as a clinician and medical teacher. His activities during the early Canadian period were particularly sought. From such an original purpose, the present volume has resulted—one unfolding every phase of the great master's life and life work. The work of the future historian, thanks to the untiring efforts of Dr. Maude Abbott, should be exceedingly simplified when he begins his reminiscing of Sir William Osler. His medical mind can be reconstructed from the periodical writings and the *Modern Medicine* which bears his name. His career has already been reviewed by the able pen of Harvey Cushing. His personality, his character, the man himself can be reconstructed from the volume by Maude Abbott. No greater tribute has been paid a medical teacher.

After the tributes of many editorials, the general articles depict Osler as a teacher, a clinician, a student, his role in American medicine, his part in medical history. His life work is then divided into periods: The early years (1849-1869), the Montreal period (1870-1884), the Philadelphia period (1889-1889), the Baltimore period (1889-1905), and the English period (1905-1919). A bibliographical section is added which contains the classified and annotated bibliography of Sir William Osler's publications.

For those who were deprived of the opportunity of having personally appreciated the man, for those whose minds were indelibly imprinted through his pres-

ence, for the lovers of the art and practice of medicine, this volume is an offering for which they are deeply indebted.

THE SPECIALTIES IN GENERAL PRACTICE. Compiled by *Francis W. Palfrey*, M. D., Instructor in Medicine at Harvard University in collaboration with 14 other teachers at Harvard Medical School. Octavo. Pp. 748. Cloth, Price \$6.50. Philadelphia: W. B. Saunders Co., 1927.

The strides that have been made in medicine are beyond human reception. In order to master completely the facts and refinements that have developed in any of the various branches of medical knowledge, it has become necessary for a man to divorce himself from the subject as a whole and center his attention upon a very limited division. Such division of labor, such limitation of practice has lead to specialization. As a result the medical curriculum is crammed full of specialties taught by specialists. The body as a unit is frequently overlooked in lieu of emphasizing a new refinement in technic. The student is apt to embark as general practitioner with the specialist's point of view. To obviate such discrepancies our medical curriculum is constantly undergoing changes. The senior is being devoted to a polishing, coordinating year, full of electives to fill up holes created.

It is in recognition of such problems that the present text has been organized. Designed for the general practitioner, specialists in the various branches of medicine (dermatology, ophthalmology, rhinology and laryngology, otology, psychiatry, genito-urinary surgery, gynecology, obstetrics, pediatrics and surgery have attempted in a post-graduate, didactic manner to present their knowledge in a form applicable to rural practice. The result is remarkable. Only the points essential to an intelligent management or counsel of the more common situations are given. Although limiting themselves to the usual diseases and presenting the few salient facts on etiology, pathology, diagnosis and treatment in com-

pact form, the surveys of the different specialties do not in any way suggest the cramped feeling so apt to exist.

No better general post-graduate time can be spent by the general practitioner than that spent in the assimilation of facts presented in this text.

PLASTIC SURGERY OF THE HEAD, FACE AND NECK. *H. Lyons Hunt, M. D., L. R. C. S. (Edin.).* Licentiate of the Royal College of Physicians, Edinburgh; Licentiate of the Faculty of Physicians and Surgeons, Glasgow. Cloth. Price \$7.00. PP 404 with 342 illustrations, and 10 colored plates. Philadelphia: Lea and Febiger, 1926.

Plastic surgery had been a bazaar, rather neglected part of general surgery until the maimed and disfigured victims of the World War made its development imperative. By a more careful, mechanical application of anatomical structures governed by recognized surgical principles, plastic surgery grew into a reality. It became one of the greatest fields of surgical endeavor. Today, cosmetic defects and deformities so relatively common in civic life but heretofore passed as unremedial defects are reaping the benefits of reconstructive surgery.

In his monograph on plastic surgery of the head, face and neck, Dr. Hunt introduces his reader to a description of the surgical anatomy of the part. Deviations from the normal result in the various deformities precede a study of these conditions and the fundamental surgical principles underlying their reconstruction. "The aptitude to correlate and apply these principles constitutes the first step toward a successful procedure. The ability to foresee the result of the proposed operation constitutes the second step. Execution is the final step." Rather complete bibliographies conclude each chapter.

Assisting the author in the presentation of his subject, Dr. Stanley Maxeiner of Minneapolis has prepared a chapter on anaesthesia and Dr. Sinclair Tousey of New York has contributed one upon physiotherapy in superficial surgery of the face.

The text is complete and comprehensive. The author has been thorough in the development of his principles. The numerous illustrations are well chosen and are of great assistance in depicting the steps and results of his endeavors. For the surgeon doing general work, the text is valuable as a reference. For one practicing plastic surgery, it should be an able guide.

CAVERNOUS SINUS THROMBOPHLEBITIS. *Wells P. Eagleton, M. D.* Medical Director, Newark Eye and Ear Infirmary; Chief of the Division of Head Surgery, Newark City Hospital; etc. Cloth. Pp. 196 illustrated. New York: Macmillan Co., 1926.

The essence of this monograph comes from the personal experiences of the author, supplemented by a wide survey of the subject. The cases upon which his conclusions are based are included in the reading matter of the text.

The material has been divided into fourteen parts. The first half of the book deals with the various types and routes of infection. Case reports are used to demonstrate observations. The elements of diagnosis and points to be considered in the differential diagnosis between sinus thrombosis, meningitis and brain abscess are emphasized. The embryology, surgical anatomy and pathology of thrombophlebitis of the cavernous sinus are discussed before turning to the question of treatment. Treatment of the condition depends largely upon the type, route of infection and condition of the patient. The latter and most important influencing factor rests upon the ability of the physician to recognize and act upon the early symptoms. The question of operative interference, sesotherapy or vaccinotherapy is adequately discussed. For those interested in a more complete study of the subject the author has included his bibliographical outline. Such a book cannot be produced without much effort and study on the part of the author. Dr. Eagleton is to be commended for his painstaking presentation of a difficult but very ably handled problem.

INTERNATIONAL ABSTRACTS

Ultra Violet Ray Therapy, Editorial, The J. of the Indiana State Med. Ass'n, Dec., 1926.

Ultra violet ray therapy is assuming an important role in the treatment of certain disease conditions. It is claimed, and perhaps with much truth in the assertion, that general ultra violet radiation of the skin increases the bactericidal power of the blood and therefore enlarges the defensive mechanism of the body. It is this action which is said to cure tuberculosis and rickets, to aid in the cure of wounds, and improve the general health of weakly children. It is this knowledge of the bactericidal power of the ultra violet radiation that has led to the employment of such form of therapy in a variety of local infectious processes. However, in the use of ultra violet ray therapy the beginner must be warned against over-enthusiasm, and especially the unwarranted and unjust claims put forth by manufacturers who, with commercial ends to serve, glibly magnify the possibilities of good results from the use of ultra violet ray therapy and in doing so they emphasize the pecuniary gains to the physician who adopts the new form of treatment for his patients.

Several months' experience in the use of ultra violet ray therapy leads us to believe that there is considerable virtue in it, but we also have learned that it has its limitations and that it will not produce the miraculous results claimed for it by the exploiters who are making the most astounding claims as to its beneficial effects in a very wide variety of affections. Naturally the best results will depend upon the kind of apparatus used and the manner in which it is used, though the most satisfactory effects will be secured in a limited number of cases. However, when all is said and done, we wish to express our appreciation of a new mode of treatment that offers promise of successful results in the treatment of a variety of disease conditions, including some of the many and varied skin manifestations.

Fortunately, a Council on Physical Therapy has been provided by the American Medical Association, and it is to that council that we shall look for valuable information as to the reliability of the various machines placed on the market by manufacturers, and

the trustworthiness of the claims that are put forth by users. We also hope that physical therapy as one of the alleviating and curative agents at our disposal will be taught conservatively in our medical institutions. The indications for and the accurate technic of applying these various modalities must be as thoroughly mastered as the use of specific drugs. As a writer in *Colorado Medicine*, October, 1926, says, "the physical and chemical changes that are brought about by the use of diathermy, infra red and ultra violet rays, x rays, etc., are as worthy of the critical attention of the physiologist and therapist as are many other such changes that take place in the body. Likewise, they are probably as difficult to understand. Their effective use can no more be learned from the instruction contained in the literature buried in the excelsior packing of physical therapy machines than can digitalis by the instructions on the bottle."

There should be authoritative instruction in this field, and it should be given a definite place in the curriculum of our schools.

Deep Roentgen Therapy in Disease of the Prostate Gland, Joseph A. Lazarus, The J. of Urol., Vol. XVII, No. 1, Jan., 1927.

The two types of treatment usually instituted for adenoma of the prostate gland are surgical removal and local therapy. The latter usually consists of massage with or without preliminary diathermy, the passage of sounds, bladder irrigations and the use of a proper dietetic regime. While the former is the procedure of choice whenever possible, the latter treatment has not infrequently yielded very poor results especially where symptoms of acute or subacute prostatism have been present. During the past four years the author has given the roentgen ray therapy to a number of cases with very gratifying results.

The literature is reviewed and the method employed described in detail with the following conclusions.

1. Urinary obstruction in adenoma of the prostate depends to a large extent upon the degree of edema of the mucosa of the prostatic urethra.

2. Congestion and mucous membrane edema are important factors in prostatitis.
3. X ray therapy is often a valuable palliative measure in the treatment of these conditions.
4. The good effects of x ray therapy are dependent upon the ability of such radiation to reduce congestion.
5. X ray does not sterilize an infected prostatic focus.
6. X ray does not reduce the size of the prostatic tumor.

The Kinds of Appendicitis that Yield to Physical Therapy, Robert T. Morris, M. D., F. A. C. S., The Am. J. of Surgery, Vol. 1, No. 6, (new series).

Of the seven different kinds of appendicitis, five chronic kinds, in some of their features, are benefitted by methods of physical therapy. Two kinds in particular require little else.

The form of appendicitis that occurs most frequently is known as "fibroid involution". The pathologic factors are cited. In the group of patients past middle life with fibroid involution of the appendix, methods of physical therapy will commonly relieve the symptoms but occasionally it becomes desirable to remove such an appendix. In the younger group of patients carrying other stigmata of physical decline along with fibroid involution removal of the appendix is seldom desirable and sometimes increases the patient's distress. It is in this group essentially that the great mass of useless appendix operations are recorded. This is because we are dealing with a class of patients suffering from defective endocrine glands. They have so many causes for physical discomfort and unrest that physical therapy methods have a distinct field in association with other forms of medical treatment that avoid surgery.

A second kind of chronic appendicitis occurs in the group of patients with relaxed peritoneal supports and endocrine dysfunction. The sagging colon and stretched mesentery give rise to so much obstruction to the venous circulation of the cecal region that the appendix becomes chronically congested and attracts attention to itself because of pain in that locality.

In the first group of cases of chronic appendicitis that we have described, pain in the appendix region is caused by contraction of the appendix with resulting irritation of nerve filaments. In the second group

of cases a quite opposite condition causes irritation. The appendix, instead of contracting, becomes swollen. Its softer inner structures try to swell within the close inelastic peritoneal sheath. Here we deal essentially with physical therapy patients. Measures for reducing the congestion mechanically or otherwise are to be applied, not surgery. Surgery gets a black eye at the hands of men who do not know but who go into action with a knife.

In a third kind of chronic appendicitis we again note irritation caused by contraction instead of by expansion of the appendix. These are the cases in which acute infection has subsided at some time previously, leaving scar tissue. Scar tissue, composed of connective tissue, contracts and irritates, giving the same disturbances as those going with fibroid involution. Remains of the appendix, potent for danger, sometimes persist. In these cases of old scar appendix surgical operation is sometimes desirable. It may be imperative if much appendix lumen has remained. Physical therapy will often give symptomatic relief from complications relating to the irritation feature but not to the infective feature.

A fourth kind of chronic appendicitis, different from the other types, relates to lymphoid hypertrophy. Here again the symptoms are caused by swelling of the appendix instead of by contraction. Patients with lymphoid hypertrophy are found most frequently in a very young group. They exhibit the so-called status lymphaticus. They have enlarged tonsils and hyperplasia of other lymphatic structures of the body. Enlargement of the lymphatic layer of the appendix is only part of the general tendency to hypertrophy of lymphoid tissue. The appendix attracts attention because of pain caused by tissues that swell within a tight sheath. In these cases surgery is very cautiously advised in consultation. It relieves appendix pain but introduces status lymphaticus dangers. Physical therapy methods aimed at guidance of the general health together with development of natural physical resistance, belong to the order of the day in this form of chronic appendicitis.

A fifth kind of chronic appendicitis relates to a chronic catarrhal inflammation involving the cecum and colon in general. In these cases the appendix sometimes produces symptoms because serous infiltrates in the submucosa lead to pressure discomfort in the tight sheath. Here again surgery is not the thing at all; it is injurious when unwisely attempted (as it is hundreds of times in the course of a year). Physical therapy methods aimed at so-called "rheumatism" or other causes for the chronic congestion of the mucosa of the colon are called for, along with appropriate

hygiene, dietary, medication, and treatment of foci of infection.

End Results in Genito-Urinary Cancer, H. W. E. Walther, M. D., The J. of Urol., Vol. XVII, No. 2, Feb., 1927.

This report embraces the cases of genito-urinary cancer observed at the Charity Hospital, New Orleans, during the years of 1921 to 1925, inclusive. Malignant growths of the kidney are not included. Of 132 case records carefully reviewed, only 116 are considered as having sufficient data to warrant inclusion in this paper. The treatment employed includes the accepted surgical procedures, radium therapy, deep x ray exposure and electro-coagulation. The age, race, year diagnosis, symptoms and duration, treatment and results are recorded in tables at the end of the report. In this study of 116 patients are to be found 47 cases of cancer of the bladder, 31 cases of cancer of the prostate, 30 cases of cancer of the penis and 8 cases of cancer of the testis.

In summarizing the results in these 116 cases we find that 52 or 44.8 per cent are dead. It is not the purpose to infer that these statistics are accurate. Fully one-third of the questionnaires mailed to out-of-town patients were returned unopened. It is only rational to surmise that some of these are also dead. Some have moved to other localities and cannot be traced. The figures have been compiled with all possible care and are given for what they are worth. Twenty-seven or 23.2 per cent are recorded as improved and most of the cases so listed have been heard from recently. A few in this classification might be cured but because of some doubt it was thought best to so rate them. Fifteen or 12.9 per cent are apparently well. All of these have been heard from within the past three months; some report monthly to the out-patient department; an attempt is being made to keep in touch with them for an indefinite period. Twelve or 10.3 per cent are listed as indeterminate because, whereas they responded to the questionnaire, the replies received were vague and of little clinical value. The same might be said of the 7 or 6 per cent stationary cases. Several of these report to the out-patient department at intervals but refuse further hospital treatment; others are being cared for by their family physician, to whom we are indebted for the information furnished. The growth was not arrested in 3 or 2.5 per cent of the cases; some of these are probably now dead or will soon die.

This study reveals the significant fact that 31 different methods in technique were directed at destroy-

ing malignant growths in four organs. As the analysis was made from the case records taken from a state general hospital, in which surgeons other than urologists participate in the allotment of genito-urinary surgical cases, it was not to be expected that the operative plan would embrace but a few procedures. Nevertheless, the wide divergence of opinion expressed in the methods adopted fully emphasizes the chaotic state into which matter has drifted.

Hermon L. Kretschmer, in his presidential address before this Association last year, said: "Without fear of contradiction, I believe it is fair to state that the most vital problem today, and the one that is no nearer solution, is that which relates to the treatment of carcinoma of the bladder and the prostate. The importance of this subject requires no emphasis. As to its frequency, comment is unnecessary. The increase in the number of cases of malignant disease of the bladder and prostate that are seen in our own work tells its own story."

Kretschmer advocates the establishment of a carcinoma register within our ranks which would include an accurate record of all cases of carcinoma, a detailed description of the technique employed in the treatment, the submitting of a section from each case to a committee so as to more intimately study the histology of these tumors. This would lead to standardization of nomenclature of malignant tumors of genito-urinary origin. By this plan we might more definitely acquire a means of deciding upon the prognosis in a given case. The means Albert C. Broders has advanced of grading carcinomas appears a move in the right direction. A study of his work convinces the writer that Broders' claims should be accorded more consideration. Only by impartially weighing all facts can such studies be affirmed or disproved.

No one realizes more than the writer the obvious shortcomings of such a tabulation as has here been attempted. The records found in general hospitals leave much to be desired. Inaccuracy and omission are met at every turn. Yet the general message such a compilation carries, even though not new, adds emphasis to the theme that more earnest endeavor is demanded if we are to achieve with cancer what already has been accomplished in dealing with tuberculosis.

Ultra Violet Rays and the Eye, W. S. Duke-Elder, B. M. J., May 29, 1926.

The application of actino-therapy to eye conditions is discussed in a preliminary report by Duke-Elder. While the method is still in its experimental stage, results have accumulated of sufficient interest to war-

rant publication. Actino-therapy may be applied in two ways: as general baths to the skin of the body generally, and as local applications to the eye itself. The diseases most amenable to general treatment are those of a chronic inflammatory character. Treatment should be instituted immediately after the acute symptoms have passed off, before the disease can be definitely labelled 'chronic'. Ocular tuberculosis, in any of its forms, gives the readiest response; startlingly good results have been obtained in phlyctenular ophthalmia; cases of infective iridocyclitis show a less dramatic and a very varying response. One case of sympathetic ophthalmitis improved very rapidly, and of three cases of choroiditis one showed no apparent change, while two showed rapid and marked improvement.

Local treatment gave good results in chronic blepharitis, chronic catarrhal conjunctivitis, corneal ulcers, corneal opacities (partially cleared up), phlyctenular keratitis, and acne. Interstitial keratitis is little influenced. Duke-Elder cites cases from the literature showing that ultra violet radiation has given favourable results in iritis and chronic irido-cyclitis, also in choroiditis and chorio-retinitis.

The Effect of Radiation on Rous Chicken Tumor, J. C. Mottram, M. D., D. P. H., The Lancet, Dec. 18, 1926.

Experiments were made upon a pure inbred strain of Barred Rock chickens, 2-3 months old. In these experiments three tumors were used, one from Dr. Gye and two from Dr. McIntosh, all of which gave rise to tumors with cell-free filtrates. They were tested from time to time to ensure that they had not lost this property. It was observed that Rous chicken tumors capable of infecting by cell-free filtrates can be destroyed by radiation. The dose required is not very different from the dose required to destroy mouse and rat tumors, and is very much less than that required to destroy Rous tumor by means of x rays applied *in vitro*. Chickens in which tumors have been made to disappear by B radiation exhibit resistance to subsequent infection. This research was carried out under a grant made by the British Empire Cancer Campaign.

Radium Necrosis of Bone, D. B. Phemister, M. D., Am. J. of R., Oct., 1926.

Experiments were performed on adult dogs for a study of the fate of the dead bone and of the reaction of the adjacent living bone, both with and without the influence of function and with and without associ-

ated infection. The changes that follow the killing of bone by radium in the treatment of sarcoma were studied in 3 cases by means of roentgenograms and in one case by examination of the specimen obtained at autopsy.

1. Uninfected necrotic bone produced by the implantation of radium is disposed of differently according to whether or not it functions mechanically in the support of the part.

2. If an entire segment of the femur or humerus of a dog is killed and subsequently used in weight bearing, the dead bone will not be sequestered, but will slowly undergo creeping substitution by ingrowing new bone.

3. If it is not used, as a result of non-union of a fracture through it, the necrotic bone will be sequestered from the living bone and very slowly absorbed.

4. Because of the radium burn of the adjacent bone and soft parts, the rate of creeping substitution by new bone or of absorption is much slower than in the case of aseptic necrotic bone, the result of circulatory disturbance or of the application of chemicals.

5. Secondarily infected areas of bone killed by radium undergo sequestration, whether or not they function mechanically during the period of sequestration.

6. Bone killed by radium in the treatment of tumors is gradually replaced by new bone if it remains free from infection and functions in the support of the part.

7. When a small necrotic portion borders on an articular surface, it does not become detached to go free into the joint as a joint mouse.

The Sella Turica, Arthur Scheuller, M. D., Am. J. of R., Oct., 1926.

Differentiation of a normal sella from a pathological one is considered of great importance by the endocrinologist, but other specialists also are vitally interested in this problem.

Three types of pituitary fossae are distinguished, the semi-circular type, the oval and the circular. These differences are due not so much to the shape of the other intracranial organs; they are more dependent on the shape of the sphenoidal sinus.

The different types of bridges in the region of sella described as pathological processes due to inflammation of the meninges or due to hemorrhages at the base of the brain are really normal variations of the sella.

The most common types of anomalies are destructions of the sella. These are found in senile persons and in cases of inflammatory processes of the sphenoid body, due to osteomyelitis, lues or tuberculosis. Another type of destruction of the sella is due to intra-cranial processes, mostly tumors starting either in the brain, the pituitary gland, the meninges, the cranial nerves or the arteries.

The invasion of the sphenoid body by a malignant or an inflammatory process can well be differentiated from the erosion of the sella due to pressure; but we cannot differentiate so well the erosion of the pituitary fossa caused by general intra-cranial pressure from the enlargement of the sella due to localized tumors. The principal differential points are the following:

1. In cases of general pressure the floor of the sella is mostly single; in localized tumors there are often seen two or three outlines of the floor of the sella because these localized processes often lie asymmetrically.
2. The anterior clinoid process in cases of general pressure is usually thin; in localized tumors normal or thicker.
3. In localized tumors calcification is often seen in the region of the sella.

Present Problems in Deep Roentgen Ray Therapy, Robert E. Fricke, M. D., Am. J. of R., Oct., 1926.

The present problems in deep roentgen therapy are questions of dosage. Until recently, the energy input of a machine was the only standard of measurement. The energy output of the tube is the only true standard.

In deep roentgen ray treatment, after having determined the erythema dose by comparison with the output of a roentgen machine whose erythema dose is known or by standardization against radium, depth dosage charts must be constructed, using an electro-scope and measuring in a water phantom or through wax. These measurements may be confirmed by readings taken during treatments, inserting the ionization chamber into cavities. We then know the percentage of the erythema dose reaching any desired point in the depth.

The surface intensity at any one portal is limited to the erythema dose. In order effectually to treat a deep-seated lesion several portals of entry may be chosen and the beams of rays so directed as to intersect in the substance of the lesion itself, avoiding an excessive dose in normal tissue. There are several in-

genious methods devised to accomplish this. Often a depth dose amounting to five times the erythema dose is required in relatively insensitive tumors; here it is advisable to assist the surface radiation with radium in the interior whenever possible.

This is the status of roentgen ray dosage today. The problem of the immediate future is to secure a reliable physical unit and a biological unit of measurement. We must look to the physicist to devise an electrical unit of ionization measurement capable of verification, so that under all conditions the same technique may be duplicated and biological results verified or discredited. Furthermore the very basis of our present standard—the erythema dose—is far from a precise entity and is no criterion by which depth intensities can be fairly judged. There is no agreement on the degree of redness constituting an erythema.

When such an inflexible standard of dosage has been perfected, then we can begin to settle many obscure biological problems: the optimum dosage for various types of malignant growths, whether high or low voltage is preferable in the individual case, whether massive or fractional radiation yields better results, etc.

The Effect of Roentgen Rays Upon the Ovary, an Experimental and Morphologic Study, M. R. Robinson, M. D., Bul. N. Y. Academy Med., 2:594, Dec., 1926.

Systematic histologic studies of irradiated rabbit ovaries, at weekly intervals, for a period of seven weeks showed that the tertiary follicles are the most vulnerable to the effect of roentgen rays, and that the ovule is the most sensitive part in the follicle. The primary follicles are not affected by a castration dose and can therefore continue to ovulate as soon as the effect of the irradiation is over, and should impregnation follow irradiation a normal pregnancy and normal offspring may be expected.

The fear that irradiated women will give birth to monsters or mentally defective children has thus far not been substantiated by experimental or clinical facts, and it may therefore be considered as purely hypothetical in nature.

Temporary castration can be accomplished at all ages, the dose is inversely proportional to the age of the female, the older the woman the smaller the dose required. Temporary sterilization should be employed whenever a suspension of ovarian function becomes a clinical indication.

Abortions can be induced with roentgen rays, and with much smaller doses than is necessary to sterilize.

The follicular damage sustained from irradiations during pregnancy is far more extensive and involves all the follicles. If permanent castration is not desired at the time of the induction of the abortion, it can be avoided, by irradiating the uterus only. Should the expected abortion not ensue, it becomes imperative to empty the uterus, for fear that a defective child may be born.

Malignant Tumors of the Breast, A Study of the Cases Admitted to the Peking Union Medical College Hospital from July 1, 1821 to September 1, 1925, Richard H. Meade, Jr., B. S., M. D., China Medical Journal, January, 1927.

The summary and conclusions of this study are of interest and are here quoted as they appeared in the original article.

1. 45 cases of malignant disease of the breast were admitted to the P.U.M.C. from July 1, 1921 to September 1, 1925.

2. 40 cases were carcinoma, and 5 were sarcoma.

3. 40 cases in all received some form of treatment.

4. Of the 35 cases of carcinoma that were treated, 14 were living at the time this report was completed. They had been living for periods varying from 2 months to 5 years and 4 months. 10 had died. Treatment had comprised surgery and radiotherapy combined, or only surgery.

5. Of the 5 cases of sarcoma of the breast 1 died during operation and the others could not be traced after leaving the hospital. There were 2 men in this group.

The only conclusion that can be drawn from this study is that malignant tumors of the breast as seen in the Peking Union Medical College Hospital differs from those seen in American hospitals only in the greater percentage of far advanced cases. This applies to foreigners as well as to the Chinese. The only answer is extensive education of the people in regard to cancer of the breast.



Technician's Bureau

American College of Physical Therapy



desires to register physical therapy technicians who are seeking positions as assistants to physicians or as aids in hospitals and clinics. Send for enrollment blank and other information. Annual fee, \$10.00, includes subscription to official journal.

Physicians and Institutions requiring physical therapy technicians are invited to call upon this bureau to fill their needs. Technicians will be furnished without charge.

Write for full information

TECHNICIAN'S BUREAU

AMERICAN COLLEGE OF PHYSICAL THERAPY
Suite 820-30 North Michigan Avenue
CHICAGO, ILLINOIS

First and Only Journal
of Its Kind Published

A Radiological Journal for
the General Practitioner

THE RADIOLOGICAL REVIEW

Editor: HAROLD SWANBERG, M. D.

EDITORIAL BOARD

Edward S. Blaine, M. D.
James T. Case, M. D.
Arthur U. Desjardins, M. D.
Gosta Forssell, M. D.
Arial W. George, M. D.
Maximilian J. Hubeny, M. D.

I. S. Trostler, M. D.

Robert Knox, M. D.
Leon T. Le Wald, M. D.
George E. Pfahler, M. D.
Alexander H. Pirie, M. D.
Henry Schmitz, M. D.
Albert Soiland, M. D.

MAIL IT TODAY!

Just your name and address accompanied by your personal check for \$2.00 will bring you an invaluable review of the best in Radiological Literature every month during 1927.

RADIOLOGICAL REVIEW PUBLISHING CO.
P. O. Box 152. Quincy, Illinois.